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STATE OF NEW HAMPSHIRE

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# REPORTS 1907-1908

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VOLUME IV — BIENNIAL

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REPORT  
OF THE  
SUPERINTENDENT  
OF  
PUBLIC INSTRUCTION  
BEING THE  
FIFTY-FIFTH REPORT UPON THE PUBLIC  
SCHOOLS OF NEW HAMPSHIRE.

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CONCORD.

1908.



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# REPORT.

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OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION,

CONCORD, N. H., October 1, 1908.

*To His Excellency Charles M. Floyd, Governor of New Hampshire:*

I have the honor to transmit through Your Excellency to the general court of New Hampshire the fifty-fifth report upon the public schools of the state, the same being the seventh biennial report, and the thirty-fourth report since the establishment of this office.

The report includes:

1. An account of the doings of the superintendent between October 1, 1906, and October 1, 1908.
2. A report upon the condition and progress of popular education in the state.
3. Recommendations of the superintendent.
4. Appendices containing statistics and other information supplementary to the preceding.

All of which is herewith

Very respectfully submitted,

HENRY C. MORRISON.

*Superintendent of Public Instruction.*





## PART I.

# THE DOINGS OF THE SUPERINTENDENT.

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The law requires that the superintendent shall biennially render a detailed report of his own doings. In obedience to the law I submit the chapters collected under the heading Part I.

### CHAPTER I.

APPOINTMENTS OF SUPERINTENDENT, OCTOBER 1, 1906,  
TO SEPTEMBER 30, 1908.

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I have been continuously in the discharge of the duties of the office, save one week in September, 1907, one week in August, 1908, and a few days at other times.

During parts of four weeks at different times I have been absent from the state assisting the educational departments of Maine and Vermont and in conference with other state superintendents at the Department of the Interior in answer to the call of the head of the federal bureau of education. In the summer of 1907, I attended the meeting of the American Institute of Instruction, at Montreal. Being chosen President of the Institute for the year 1908, I have given the necessary amount of time to the duties of that office and have attended the annual meeting at Burlington, Vt., at which I was re-elected President. I have from time to time responded to calls for occasional addresses in other states on subjects relating to the national public school effort. Follows a detailed list:

## TABLE 1.

## APPOINTMENTS OF SUPERINTENDENT.

FROM OCTOBER 1, 1906, TO OCTOBER 1, 1908.

1906.

Tuesday, October 2. Concord, meeting of trustees of State Normal School.

Wednesday, October 3. Conference with committee of State Grange.

Thursday, October 18. Concord, State Teachers' Association.

Friday, October 19. Concord, State Teachers' Association.

Saturday, October 20. Concord, State Teachers' Association.

Thursday, October 25. Lewiston, Maine State Teachers' Association, address, "Intellectual Honesty."

Friday, October 26. Nottingham, Institute and evening address, "Good Schools and What They Mean to Town and State."

Sunday, October 28. Concord, North Congregational Church, address, "The Church and the Public Schools."

Tuesday, October 30. Stark, Institute and evening address, "Good Schools and What They Mean to Town and State."

Wednesday, October 31. Jefferson, Institute and evening address, "Good Schools and What They Mean to Town and State."

Friday, November 2. Keene, Institute and Cheshire County Teachers' Association.

Wednesday, November 7. Danbury, Institute and evening address, "Good Schools and What They Mean to Town and State."

Thursday, November 8. Concord, conference with committee of State Grange.

Friday, November 9. Franconia, Institute and Ammonoosuc Valley Teachers' Association, evening address, "Good Schools and What They Mean to Town and State."

Friday, November 16. Madison, Institute and Carroll County Teachers' Association.

Saturday, November 17. Tilton, Academy Teachers' Association, address, "Some Present Tendencies in New Hampshire Schools and their Interpretation."

Monday, November 19. Exeter, Gilman Grange, address.

Wednesday, November 21. Canaan, inspection of high school.

Friday, November 23. Plymouth, State Normal School.

Tuesday, November 27. Concord, West Point examinations.

Friday, November 30. Concord, superintendents' conference.

Saturday, December 1. Concord, superintendents' conference.

Tuesday, December 4. Meredith, inspection of high school and conference with school board.

Wednesday, December 5. Plymouth, State Normal School.

Friday, December 7. New Ipswich, Institute and evening address, "Good Schools and What They Mean to Town and State."

Tuesday, December 11. Gilmanton, inspection of Gilmanton Academy and common schools.

Thursday, December 13. Pittsfield, inspection of high school and village schools.

Friday, December 14. Pittsfield, Institute and evening address, "Good Schools and What They Mean to Town and State."

Monday, December 17. Berlin, inspection of schools.

Tuesday, December 18. Berlin, inspection of schools.

Wednesday, December 19. Berlin, inspection of schools.

Thursday, December 20. Berlin, inspection of schools.

Friday, December 21. Manchester, committee State Library Association.

Thursday, December 27. Concord, Legislative Committee State Teachers' Association.

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Friday, January 4. Meriden, Institute and evening address, "The Meaning of our Schools and their Needs."

Sunday, January 6. Concord, Men's Union, South Congregational Church, address, "Needs of New Hampshire Schools."

Monday, January 7. Newmarket, inspection of high school; evening, Rochester, address, "The School and the Parent."

Tuesday, January 8. Concord, medical examinations.

Wednesday, January 9. Concord, medical examinations.

Thursday, January 10. Orfordville, evening address, "The Schools and their Needs."

Friday, January 11. Piermont, Institute, and evening address, "The Meaning of our Schools and their Needs."

Friday, January 18. Concord, Rhodes Scholarship examination; afternoon, Newport, Sullivan County Teachers' Association, address, "Intellectual Honesty."

Saturday, January 19. Concord, meeting of the trustees of State Normal School.

Thursday, January '24. Concord, meeting of the board of state medical examiners.

Friday, January 25. Newton, Institute.

Monday, January 28. Brookline, evening address, "Supervision."

Tuesday, January 29. Plymouth, meeting of trustees of State Normal School.

Wednesday, January 30. Campton, evening address, "Supervision."

Friday, February 1. Belmont, Institute and evening address, "Supervision."

Wednesday, February 6. Manchester, committee of State Normal School trustees.

Wednesday, February 13. Hooksett, conference with school board.

Thursday, February 14. Andover, Pomona Grange, address, "Organization of Rural Schools."

Friday, February 15. Morning, Concord, Merrimack Valley Teachers' Association, address, "Education for Service;" evening, Pike Station Grange, address, "Supervision."

Saturday, February 16. Manchester, conference of classical teachers.

Monday, February 18. Manchester, Annapolis examinations.

Tuesday, February 19. Atkinson, evening address, Atkinson Grange, "Supervision."

Thursday, February 28. New Ipswich, evening address, Watatic Grange, "Supervision."

Friday, March 1. Brentwood, evening address, Keeneboro Grange, "Supervision."

Saturday, March 2. Concord, Rhodes Scholarship Committee.

Monday, March 4. Temple, evening address, "Supervision."

Tuesday, March 5. Springfield, evening address, Beaver Grange, "Supervision."

Wednesday, March 6. Hill, evening address, "The Schools and the State."

Thursday, March 7. Boston, Massachusetts Conference New England State Superintendents.

Friday, March 8. Meredith, town district meeting, address, "Supervision."

Monday, March 11. Ashland, evening address, Squam Lake Grange, "Supervision."

Friday, March 15. Milford, evening, meeting with officers of supervisory district.

Monday, March 18. Hanover, conference with President Tucker.

Monday, March 25. Hillsboro Bridge, special district meeting, address, "Supervision."

Tuesday, March 26. Meredith, special district meeting.

Thursday, March 28. Plymouth, superintendents' conference.

Friday, March 29. Plymouth, superintendents' conference.

Saturday, March 30. Plymouth, superintendents' conference.

Tuesday, April 2. Concord, morning, hearing before Legislative Committee, meeting trustees State Normal School.

Friday, April 5. Durham and Exeter, in connection with Jamestown Exposition exhibit.

Monday, April 8. Berlin, inspection of high school.

Tuesday, April 9. Berlin, inspection of high school.

Wednesday, April 10. Bradford, conference with selectmen.

Saturday, April 13. Woodsville, meeting of joint boards of two districts of Haverhill, two districts of Bath.

Monday, April 15. Lancaster, school inspection.

Tuesday, April 16. Lancaster, inspection of high school.

Wednesday, April 17. Lancaster, inspection of high school.

Saturday, April 20. Salem, meeting of joint boards of Atkinson, Hudson, Salem.

Saturday, April 27. Plymouth, State Normal School.

Tuesday, April 30. Salem, inspection of schools, evening address.



Wednesday, May 1. Concord, address, Capital Grange.

Friday, May 3. Portsmouth, Institute and Rockingham County Association.

Friday, May 10. Conway, address, Pequaket Grange, "State School System."

Thursday, May 16. Morning, Concord, meeting state boards of medical examiners; evening, Hanover, conference of high school teachers.

Friday, May 17. Hanover, conference.

Saturday, May 18. Hanover, conference.

Tuesday, May 21. Stratford, inspection of schools; meeting of joint supervisory board, Stratford, Colebrook, Northumberland, Columbia.

Wednesday, May 22. Groveton, inspection of schools.

Thursday, May 23. Concord, first meeting of board of examiners for registration of nurses.

Friday, May 24. Ashland, Institute and meeting of Winnepesaukee Teachers' Association.

Saturday, May 25. Concord, conference on superintendents' examinations.

Monday, May 27. Hampton, inspection of high school.

Tuesday, May 28. Gilmanton, inspection of Gilmanton Academy.

Wednesday, May 29. Franklin, morning, meeting of joint boards of Hill, Danbury and Tilton; afternoon, inspection of high school.

Friday, May 31. Nashua, Institute and Merrimack Valley Teachers' Association.

Monday, June 3. Reeds Ferry, inspection of McGaw Institute.

Tuesday, June 4. Goffstown, inspection of high school.

Wednesday, June 5. Rye, meeting of joint boards of Rye, North Hampton, Greenland, Newington; conference with school board.

Thursday, June 6. Northwood, inspection of Coe's Academy; evening address, "Practical Education," Village Improvement Association.

Friday, June 7. Strafford, inspection of Austin-Cate Academy.

Saturday, June 8. Plymouth, conference with school board.

Sunday, June 9. Plymouth, State Normal School, baccalaureate address.

Monday, June 10. Ashland, meeting of joint boards of Ashland, Holderness, Meredith.

Tuesday, June 11. Epping, inspection of high school preparatory to approval.

Wednesday, June 12. Plymouth, meeting trustees State Normal School.

Thursday, June 13. Troy, address to the graduating class of high school.

Saturday, June 15. Concord, address to the graduating class of St. Mary's School.

Monday, June 17. Alton, conference with school board.

Tuesday, June 18. Concord, examinations for registration of nurses; Wolfeboro, conference with school board.

Wednesday, June 19. Stratham, conference with school board.

Thursday, June 20. Penacook, address to the graduating class of high school.

Friday, June 21. Gilmanton, address at Gilmanton Academy.

Tuesday, June 25. Rye, meeting of joint boards of Rye, Greenland, North Hampton, Newington.

Friday, June 28. Concord, state examinations.

Saturday, June 29. Concord, state examinations.

Monday, July 1 to 5. Montreal, American Institute of Instruction.

Saturday, July 6. Manchester, consultation with committee of trustees of Coe's Academy.

Tuesday, July 9. Concord, medical examinations.

Wednesday, July 10. Concord, medical examinations.

Tuesday, July 16. Willoughby Lake, Vt., service of Vermont State Department of Schools.

Wednesday, July 17. Willoughby Lake, Vt.

Thursday, July 18. Willoughby Lake, Vt.

Saturday, July 27. Meredith, conference with school board.

Thursday, August 1. Plymouth, inspection of summer school.

Wednesday, August 7. Plymouth, meeting committee of State Normal School trustees.

Monday, August 12 to 24. Plymouth, Summer Institute, ten lectures on supervision.

Monday, August 26. Plymouth, state examinations.

Friday, August 30. Claremont, conference with high school authorities.

Tuesday, September 17. Concord, meeting of board of examiners for nurses' registration.

Thursday, September 19. Keene, address, graduation of Nurses' Training School.

Friday, September 20. Greenfield, Institute and evening address, "Good Schools: What They Are, What They Mean, How They Are Built Up."

Saturday, September 21. Concord, meeting Educational Council.

Monday, September 23. Contoocook, Institute.

Tuesday, September 24. Haverhill, conference with school board.

Thursday, September 26. Acworth, Institute and evening address, "Good Schools: What They Are, What They Mean, How They Are Built Up."

Friday, September 27. Cornish, Institute and evening address, "Good Schools: What They Are, What They Mean, How They Are Built Up."

Saturday, September 28. Boston, American Institute directors.

Monday, September 30. Northwood, Institute.

Tuesday, October 1. Concord, Normal School trustees.

Wednesday, October 2. Littleton, school board conference for North Grafton County.

Friday, October 4. Londonderry, Institute.

Tuesday, October 8. Ossipee, school board conference for Carroll County.

Wednesday, October 9. Lancaster, school board conference for Coos County.

Friday, October 11. Hampton, Institute and evening address, "Good Schools: What They Are, What They Mean, How They Are Built Up."

Tuesday, October 15. Laconia, school board conference for Belknap County.

Wednesday, October 16. Plymouth, school board conference for Grafton County, southeast section.

Thursday, October 17. Exeter, afternoon, address, "Industrial Education." State Horticultural Society; Concord, evening, School Masters' Club.

Friday, October 18. Concord, State Teachers' Association.

Saturday, October 19. Concord, State Teachers' Association.

Monday, October 21. Danbury, Institute and evening address, "A Fair Chance for Every Child."

Wednesday, October 23. Exeter, school board conference for Rockingham County, eastern section.

Friday, October 25. East Jaffrey, Institute and evening address, "Good Schools: What They Are, What They Mean, and How to Get Them."

Monday, October 28. Webster, Institute.

Tuesday, October 29. Hillsboro, school board conference for Hillsboro County.

Wednesday, October 30. Keene, school board conference for Cheshire County.

Friday, November 1. Sandown, Institute.

Monday, November 4. Contoocook, Grange, evening address.

Tuesday, November 5. Hollis, Grange, evening address.

Thursday, November 7. Newport, school board conference for Sullivan County.

Friday, November 8. Walpole, Institute and evening address.

Saturday, November 9. Bellows Falls, Vt., conference directors American Institute.

Monday, November 11. Hanover, consultation in connection with spring conference.

Tuesday, November 12. Lebanon, conference of school boards for Grafton County, western section.

Wednesday, November 13. West Concord, Pomona Grange, address.

Thursday, November 14. Concord, State Library Association, address.

Friday, November 15. Thornton, Institute and evening address, "Good Schools: What They Are, What They Mean, and How to Get Them."

Saturday, November 16. Plymouth, State Normal School.

Tuesday, November 19. Salem, school board conference for Rockingham County, western section.

Thursday, November 21. Rochester, school board conference for Strafford County.

Friday, November 22. Somersworth, Institute and Strafford County Teachers' Association.

Saturday, November 23. Boston, directors of American Institute.

Tuesday, November 26. Concord, school board conference for Merrimack County.

Tuesday, December 3. Plymouth, meeting trustees State Normal School.

Wednesday, December 4. Plymouth, inspection of high school and State Normal School.

Thursday, December 5. Monroe, Grange, evening address, "Critical Needs of our Schools."

Friday, December 6. Whitefield, inspection of high school.

Monday, December 9. New Boston, Grange, evening address, "Our Money's Worth in Public Schools."

Tuesday, December 10. Manchester, Board of Trade, evening address.

Wednesday, December 11. Concord, State Nurses' Association, address, "Registration of Nurses."

Thursday, December 12. Wilton, inspection of high schools.

Friday, December 13. Plymouth, State Normal School.

Saturday, December 14. Plymouth, State Normal School.

Monday, December 16. Manchester, Men's Club, First Congregational Church, address, "A City Public School System."

Tuesday, December 17. Boston, State Normal School matters.

Friday, December 20. Concord, meeting state board of medical examiners.

Friday, December 27. Concord, superintendents' conference.

Saturday, December 28. Concord, superintendents' conference.

Monday, December 30. Claremont, dedication of school building, address.

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Wednesday, January 1. Manchester, meeting of Normal School finance committee.

Friday, January 3. Newport, Vt., evening address, "The Public School and the Citizen."

Saturday, January 4. Boston, meeting of executive board American Institute of Instruction.



Tuesday, January 7. West Lebanon, inspection of schools.

Wednesday, January 8. Andover, inspection of Proctor Academy.

Thursday, January 9. Concord, meeting of board of examiners for nurses' registration.

Friday, January 10. Plymouth, State Normal School.

Saturday, January 11. Pembroke, address at dedication of new school building.

Monday, January 13 to 16. Berlin, inspection of schools.

Tuesday, January 14. Concord, medical examinations.

Wednesday, January 15. Concord, medical examinations.

Saturday, January 18. Boston, meeting of executive board American Institute of Instruction.

Wednesday, January 22. Franklin, inspection of schools and evening address before Board of Trade, "Industrial Education."

Friday, January 24. Concord, meeting of Normal School Trustees; Boston, evening, address before New Hampshire newspaper men, "The Public School Situation."

Monday, January 27. Dover, address to teachers.

Tuesday, January 28. Dover, inspection of schools.

Thursday, January 30. Claremont, inspection of schools and consultation with school board.

Friday, January 31. Claremont, Institute and Sullivan County Teachers' Association; Manchester, judge at prize speaking contest.

Saturday, February 1. Boston, meeting of executive board American Institute of Instruction.

Wednesday, February 5. Plymouth, State Normal School.

Wednesday, February 5 and 6. Bethlehem, inspection of schools and consultation with board.

Friday, February 7. Littleton, Institute and Ammonoosuc Valley Teachers' Association.

Monday, February 10 to 13. Colebrook, inspection of schools and consultation with school boards.

Wednesday, February 12. East Columbia, investigation of conditions for consolidation and evening address, "Consolidation of Schools."

Thursday, February 13. Haverhill, address at dedication of schoolhouse.

Friday, February 21 to 27. Washington, conference of state superintendents.

Tuesday, March 3. Gorham, inspection of schools and consultation with school board.

Wednesday, March 4. Gorham, evening address, "The Gorham Schools."

Thursday, March 5. Boston, conference of New England state superintendents.

Friday, March 6. Boston, conference on rural progress, address, "The Vocational School Question."

Wednesday, March 11. Manchester, meeting of Normal School finance committee.

Thursday, March 12. Hillsboro, town district school meeting.

Saturday, March 14. Concord, meeting of Rhodes Scholarship Committee.

Monday, March 16. Plymouth, meeting of State Normal School trustees.

Tuesday, March 17. Bristol, Lake and Valley Pomona Grange, address, "The State's Interest in Public Schools."

Wednesday, March 18. Hillsboro Bridge, inspection of schools and evening address, "Good Schools and What They Mean to Town and State."

Thursday, March 19. Derry, conference with Pinkerton Academy trustees.

Thursday, March 26. Plymouth, superintendents' conference.



Friday, March 27. Concord, state teachers' examinations.

Saturday, March 28. Concord, state teachers' examinations.

Tuesday, March 31. Greenland, conference with school board.

Thursday, April 2. West Lebanon, conference with school board.

Friday, April 3. Plymouth, conference of joint boards of Rumney, Campton, and Woodstock.

Monday, April 6. Concord, meeting of board of examiners for nurses' registration.

Tuesday, April 7. Concord, meeting of trustees of State Normal School.

Wednesday, April 8. Manchester, Vt., two addresses for Vermont Department of Education.

Thursday, April 9. Middlebury, Vt., two addresses for Vermont Department of Education.

Friday, April 10. Rutland, Vt., two addresses for Vermont Department of Education.

Saturday, April 11. Boston, conference of executive board American Institute of Instruction.

Monday, April 13. Vermont.

Tuesday, April 14. St. Albans, Vt., two addresses for Vermont Department of Education.

Wednesday, April 15. Essex Junction, Vt., two addresses for Vermont Department of Education.

Thursday, April 16. Montpelier, Vt., two addresses for Vermont Department of Education.

Saturday, April 18. Boston, meeting of executive board American Institute of Instruction.

Friday, April 24. North Stratford, Institute.

Monday, April 27. Swanzey, consultation with superintendent and inspection of schools.

Tuesday, April 28. Winchester, consultation with school board and inspection of schools.

Wednesday, April 29. Concord, meeting of trustees of State Normal School.

Thursday, April 30. Manchester, inspection of St. Anselm's College.

Friday, May 1. Manchester, Institute and Merrimack Valley Teachers' Association; Wentworth, conference with school board.

Monday, May 4. Exeter, Institute and Rockingham County Teachers' Association, address, "Securing Results."

Tuesday, May 5. Goffstown, inspection of Goffstown high school and conference with school board; North Weare, Grange, evening, address, "Three Factors in Building Up Good Schools."

Friday, May 8. Bartlett, Institute and Carroll County Teachers' Association.

Saturday, May 9. Bartlett.

Monday, May 11. Franklin, conference with school board.

Tuesday, May 12. Plymouth, State Normal School.

Wednesday, May 13. Bedford, conference with school board.

Thursday, May 14. Concord, meeting of state boards of medical examiners.

Thursday, May 14 to 16. Hanover, conference of high school teachers, address, "Correlation of the Educational Forces of a State."

Tuesday, May 19 and 20. Campton, inspection of schools.

Thursday, May 21. Gilmanton, inspection of Gilmanton Academy.

Friday, May 22. Laconia, Institute and Winnepesaukee Teachers' Association.

Tuesday, May 26. Milford, conference with school board.

Wednesday, May 27. Hinsdale, conference with Winchester and Hinsdale school boards; Surry, Grange,

evening address, "Three Factors in Building Up Good Schools."

Thursday, May 28. Walpole, conference with school board.

Tuesday, June 2. Warren, conference with school board.

Wednesday, June 3. Plymouth, meeting of State Normal School trustees.

Monday, June 8. Colebrook, address at high school graduation.

Tuesday, June 9. Errol, consultation with school board.

Thursday, June 11. Plymouth, Normal School graduation and meeting of trustees.

Saturday, June 13. Boston, meeting of executive board American Institute of Instruction.

Wednesday, June 17. Tilton, conference with joint school boards.

Friday, June 26. Concord, state teachers' examinations.

Saturday, June 27. Concord, state teachers' examinations.

Monday, June 29. Hinsdale, meeting of joint boards of Hinsdale, Winchester, and Swanzey.

Tuesday, June 30. Newport, address at meeting of State Board of Trade.

Monday, July 6 to 9. Burlington, Vt., American Institute of Instruction.

Monday, July 13. Maine.

Tuesday, July 14. Farmington, Maine, evening, address, "The Public Schools and the New Democracy."

Wednesday, July 15. Maine, address to superintendents, "The Work of the Pioneer Superintendent."

Wednesday, July 15 and 16. Concord, medical examinations.

Friday, July 24. Fitzwilliam, meeting of joint boards of Troy, Fitzwilliam, Jaffrey, Rindge, and formation of supervisory union.

Tuesday, July 28. Greenland, meeting of joint boards of Rye, Greenland, North Hampton, and Newington.

Thursday, July 30. Keene, meeting of the joint boards of Dublin, Swanzey, and Keene.

Monday, August 3. Warner, conference with trustees of Simonds Free High School.

Friday, August 14. Warner, meeting of alumni of Simonds Free High School, address, "Practical Needs in High School Education."

Monday, August 24 to 28. Plymouth, superintendents' conference.

Friday, August 28 and 29. Plymouth, state teachers' examinations.

Friday, September 11. Concord, meeting of Educational Council committee on secondary program of studies.

Saturday, September 12. Concord, meeting of Educational Council committee on secondary program of studies.

Tuesday, September 15. Concord, meeting of board of nurses' examiners.

Friday, September 18. Newbury, Institute and evening address, "The Teacher, the Parent and the Child."

Saturday, September 19. Concord, meeting of Educational Council.

Wednesday, September 23. Fremont, Grange, address, "The Country Town and the Public School."

Friday, September 25. Weare Center, Institute and evening address, "The Public School and the Country Town."

Saturday, September 26. Boston, meeting of executive board American Institute of Instruction.

Monday, September 28 and 29. Educational Council committee on elementary program.

## CHAPTER II.

## PERSONAL INSPECTION OF SCHOOLS.

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Whenever more imperative duties would permit, I have visited and inspected schools, both elementary and secondary. In numerous instances I have made actual tests of the proficiency of the pupils and of the efficiency of the local school system as a whole. In the cases of Berlin, Claremont, Franklin, Gorham and Pittsfield, I have made a more thoroughgoing investigation at the request of the school boards and have reported to them my findings.

I have visited and inspected one or more elementary schools in each of the following list of districts:

Berlin,	Littleton.
Bethlehem (special),	Manchester.
Campton,	Milford,
Canaan (special),	Newport.
Claremont,	Northumberland.
Colebrook (town).	Pittsfield,
Colebrook (special),	Plymouth,
Columbia,	Rumney,
Dover,	Salem,
Epping,	Stratford,
Errol,	Swanzey,
Franklin,	Walpole,
Gilmanton,	Warren,
Goffstown (special),	Whitefield (special),
Hillsborough (special).	Wilton.
Hopkinton.	Woodstock.
Lebanon (special),	Woodsville.
Lebanon, West,	

Such inspection has in most cases been incidental to other duties in town. It has seldom been possible to make it as thorough and definite as I could wish, and it ought to have been much more extensive. The results of my observations in these towns have their proportionate part in the conclusions which I report in Part II.

As in former years, I have felt obliged to give a somewhat disproportionate share of my time and attention to the inspection of high schools and academies, since these secondary schools are subject to the annual approval of the state superintendent. For the major part of my information concerning these schools, I have been obliged to depend upon reports made by them in response to specific inquiries and upon the correspondence which has followed a close scrutiny of these reports. I have been able to reach the following schools for personal inspection:

Andover, Proctor Academy,	Newmarket High School,
Berlin High School,	Newport High School,
Bethlehem High School,	Northwood, Coe's Academy,
Colebrook Academy,	Penacook High School,
Dover High School,	Peterboro High School,
Epping High School,	Pittsfield High School,
Franklin High School,	Plymouth High School,
Gilmanton Academy,	Strafford, Austin-Cate Acad-
Goffstown High School,	emy,
Gorham High School,	Stratford High School,
Hampton Academy,	Whitefield High School,
Hillsboro High School,	Wilton High School,
Lancaster High School,	Winchester High School,
Meredith High School,	Woodsville High School.
Merrimack, McGaw Institute,	
New Ipswich, Appleton Acad-	
emy,	

Seventy or more secondary schools in the state require all the time which a busy man can give if they are to be



adequately inspected by the state in the thirty-six to thirty-eight weeks of their school year. At present, the department knows what they have done in their year's work, fairly well; it cannot know how they have done it, except by following up written reports with personal investigation.

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### CHAPTER III.

#### LECTURES OF THE SUPERINTENDENT.

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“He shall visit and lecture upon educational subjects in as many towns and cities of the state during the term of his office as the time occupied by other official duties will permit.” Chapter 94, section 3.

In compliance with the requirements of the law, I have delivered seventy-one lectures, or addresses, upon topics related to our public schools, in sixty-eight different towns and cities. The names of towns, the titles of addresses and the occasion of their delivery can be found in Table I. The numbers given are exclusive of talks to teachers at institutes or elsewhere and exclusive of numerous brief speeches upon educational matters. They include only formal addresses to the public.

In the main, these lectures have dealt with different phases of the general subject of the relation of good schools to the prosperity of town and state. I have constantly emphasized a reasonable definition of excellence in schools and have sought to set forth feasible ways in which the schools might be improved. I have also had occasion to lecture upon the subject of industrial education in response to a growing interest in that direction. Many of my addresses have been in explanation of the subject of dis-

trict supervision, although much fewer than in the preceding term of office. I have also, on several occasions, addressed district school meetings in response to the requests of local school boards.

Ninety per cent. of all lectures have been delivered to audiences in rural towns or to audiences primarily interested in rural schools.

## CHAPTER IV.

### ATTENDANCE AND CHILD LABOR.

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The statutes provide that every person having the custody and control of a child between the ages of eight and fourteen, shall cause such child regularly to attend school. The statutes further provide that no child under the age of fourteen years may be employed in manufacturing, mercantile, or other establishments while the public schools are in session; and that no child under the age of sixteen may be so employed except upon presentation of an affidavit of age and certificate of ability to read and write legibly simple sentences in the English language. Chapter 93, sections 10-16 inclusive.

The law further provides (chapter 93, section 15, as amended by chapter 61, Laws of 1901): "The state superintendent of public instruction shall have authority to enforce the laws relating to attendance at school and the employment of minors, and, for this purpose, he and any deputy appointed by him shall be vested with the powers given by law to truant officers when authorized by school boards to enforce the laws relating to attendance at school and the employment of children. And the expenses necessarily incurred by the state superintendent in such



enforcement shall be paid, as audited and allowed by the governor and council."

#### FACTORY INSPECTION.

In this department I have employed Mr. Robert J. Mitchell, of Newmarket, as regular factory inspector. Mr. Mitchell has performed his duties thoroughly, patiently, with tact and absolute integrity. The office has perfected its methods of recording and controlling inspections, so that we are able to make a more complete report than that last issued.

The purpose of the department for the future is to group the towns and cities of the state into the following classes:

Class I, all towns and cities engaged in the cotton industry.

Class II, the larger manufacturing towns not to any considerable extent engaged in the cotton industry.

Class III, smaller towns with few or no factories.

Communities falling within Class I will be inspected twice each year while schools are in session; those in Class II, once a year; and those in Class III, at least once in two years. In addition to this inspection the department has during the past summer vacation inspected all the larger manufacturing cities and towns with a view to gaining control of that phase of child labor prohibited by the statutes applying to children under the age of twelve at any time, whether in term time or vacation.

The inspector is required thoroughly to examine every mill or other establishment entered, together with all youth employed therein, and to report to this office, daily if possible, by mail. A card like the form given in Figure 1 is used for the inspector's report, and after examination by the superintendent is filed away for reference.

## Figure 1.

STATE OF NEW HAMPSHIRE.

DEPARTMENT OF PUBLIC INSTRUCTION.

CHILD LABOR FACTORY INSPECTION.

Industry.....Town or City.....  
 Establishment .....  
 Children under 14.....No. of doubtful legal age.....  
 Between 14 and 16 Certificated.....Uncertificated.....  
 No. tested for literacy by Inspector.....  
 No. failed to pass literacy test.....  
 [To be made up on the spot and mailed from point of  
 inspection.]

The department thus keeps informed of both the employment of children by the factory and the methods of local officers in issuing certificates of age and literacy.

TABLE No. 2.  
FACTORY INSPECTION.

TOWN OR CITY.	Date.	Under 16.	Under 14.	14-16 certificated.	14-16 not certificated.	No. of estab- lishments.
Alton .....	Jan., 1908	.....	.....	.....	.....	2
Andover .....	March, 1908	.....	.....	.....	.....	3
Antrim .....	April, 1907	6	.....	6	.....	8
.....	June, 1908	.....	.....	.....	.....	5
Ashland .....	Feb., 1907	9	.....	9	.....	10
.....	Oct., 1907	2	.....	2	.....	12
Barnstead .....	Oct., 1906	1	.....	1	.....	2
Bartlett .....	Dec., 1908	1	.....	1	.....	1
Bath .....	Oct., 1907	.....	.....	.....	.....	1
Belmont .....	Jan., 1907	6	.....	6	.....	4
.....	Dec., 1907	10	.....	10	.....	8
Bennington .....	Apr., 1907	1	.....	1	.....	4
.....	June, 1908	.....	.....	.....	.....	4
Berlin .....	Feb., 1907	13	.....	13	.....	17
.....	Oct., 1907	23	.....	23	.....	27
Boscawen .....	Jan., 1907	1	.....	1	.....	3
Bristol .....	Jan., 1907	1	.....	1	.....	7
.....	Oct., 1907	.....	.....	.....	.....	15
Canaan .....	March, 1908	.....	.....	.....	.....	2
Candia .....	Jan., 1908	.....	.....	.....	.....	1
Chesterfield .....	April, 1908	.....	.....	.....	.....	4
Claremont .....	June, 1907	44	.....	40	4	14
.....	Nov., 1907	46	1	43	2	23
.....	June, 1908	17	.....	17	.....	21
Concord .....	Jan., 1907	14	.....	14	.....	18
.....	.....	12	.....	12	.....	15
.....	March, 1908	3	.....	2	1	26
Conway .....	Jan., 1908	.....	.....	.....	.....	9
Danville .....	Nov., 1906	.....	.....	.....	.....	1
Derry .....	March, 1907	30	.....	30	.....	5
.....	June, 1908	32	.....	32	.....	7
Dover .....	Dec., 1906	127	.....	127	.....	22
.....	Nov., 1907	112	.....	100	12	35
Enfield .....	Jan., 1907	5	.....	5	.....	3
.....	March, 1908	1	.....	1	.....	5
Epping .....	Jan., 1908	1	.....	1	.....	5
Epsom .....	Feb., 1908	.....	.....	.....	.....	5
Exeter .....	Sept., 1906	34	.....	34	.....	9
.....	Jan., 1908	36	.....	36	.....	15
Farmington .....	Dec., 1906	1	.....	1	.....	7
.....	Dec., 1907	1	.....	1	.....	8
Fitzwilliam .....	April, 1908	1	.....	.....	1	4
Franklin .....	Jan., 1907	31	.....	31	.....	12
.....	Sept., 1907	33	.....	28	5	23
.....	March, 1908	32	.....	32	.....	22
Gilsum .....	April, 1908	.....	.....	.....	.....	2
Gorham .....	Feb., 1907	2	.....	2	.....	5
.....	Oct., 1907	2	.....	2	.....	5
Greenville and New Ipswich	June, 1907	29	.....	29	.....	5
.....	Dec., 1907	30	.....	30	.....	5
.....	April, 1908	62	.....	61	1	7
Groveton .....	Oct., 1907	1	.....	1	.....	4
Hampstead .....	Jan., 1908	2	.....	1	1	2
Harrisville .....	April, 1908	4	.....	3	1	5
Hemiker .....	April, 1907	.....	.....	.....	.....	5
.....	June, 1908	.....	.....	.....	.....	6
Hill .....	Oct., 1907	3	.....	.....	3	2
Hillsborough .....	April, 1907	6	.....	6	.....	5
.....	June, 1908	7	.....	7	.....	4
Hinsdale .....	June, 1907	3	.....	3	.....	10
.....	April, 1908	1	.....	1	.....	8

TABLE No. 2.—*Continued.*

TOWN OR CITY.	Date.	Under 16.	Under 14.	14-16 certificated.	14-16 not certificated.	No. of estab- lishments.
Hooksett .....	March, 1907	9		9		3
	Feb., 1908		Mills	not r	annin g.	
Hopkinton-Contoocook.....	June, 1908					4
Jaffrey.....	Nov., 1907	12		12		5
	April, 1908	16		16		4
Keene .....	June, 1907	39		39		36
	April, 1908	37		31	6	46
Laconia .....	Oct., 1907	48		44	2	39
Lancaster .....	Oct., 1907					8
Lebanon .....	Jan., 1907	33		33		11
	March, 1908	22		22		18
Lincoln .....	Oct., 1907	20	1	9	10	6
Lisbon .....	Oct., 1907	3		3		7
Littleton.....	Oct., 1907	10		10		6
Londonderry .....	Jan., 1908					1
Manchester.....	May, 1907	423	1	401	21	78
	May, 1908	359		342	17	110
Marlborough .....	June, 1907	11		11		7
	April, 1908	7		7		6
Meredith .....	Oct., 1907					8
Milford .....	Feb., 1907	18		18		8
	May, 1907	26		26		10
	Feb., 1908	15		15		9
Milton .....	Dec., 1906	3		3		5
	Dec., 1907	3		3		10
Nashua .....	March, 1907	204		204		63
	March, 1908	133		125	8	85
Nelson .....	April, 1908					1
New Durham .....	Oct., 1907	1			1	5
Newfields .....	Oct., 1906					1
New Ipswich .....	June, 1907	6		6		1
Newmarket .....	Sept., 1906	58		57	1	9
	Jan., 1907	52		52		9
	Feb., 1908	59		58	1	10
Newport.....	June, 1907	10		10		6
	Nov., 1907	17		15	2	9
Newton.....	Jan., 1908	1		1		7
Penacook (Concord) .....	Jan., 1907	15		15		5
	March, 1908	13		12	1	8
Peterborough .....	Feb., 1907	21		21		7
	April, 1908	8		8		8
Pittsfield .....	Feb., 1907	13		13		9
	Feb., 1908	10		10		9
Plaistow .....	Oct., 1906					3
Plymouth .....	Oct., 1907	1			1	6
Portsmouth .....	Oct., 1906	16		16		14
	Jan., 1908	6		6		20
Raymond.....	Oct., 1906	5		5		3
	Jan., 1908	3		2	1	2
Rindge .....	April, 1908					1
Rochester .....	Dec., 1906	60		60		20
	Dec., 1907	59		59		28
Rollinsford .....	Dec., 1906	16		16		3
	Nov., 1907	19		17	2	6
Salem .....	March, 1907	1		1		5
Sandown .....	Nov., 1906					2
Seabrook .....	Jan., 1908					1
Somersworth.....	Dec., 1906	101		101		11
	Dec., 1907	118	1	108	9	14
Sullivan .....	April, 1908					2
Suncook.....	March, 1907	67		67		5

TABLE No. 2.—*Continued.*

TOWN OR CITY.	Date.	Under 16.	Under 14.	14-16 certificated.	14-16 not certificated.	No. of estab- lishments.
Suncook .....	Feb., 1908	50	.....	49	1	7
Swanzy .....	Nov., 1907	6	.....	5	1	10
.....	April, 1908	3	.....	3	.....	9
Tilton and Northfield .....	Oct., 1907	8	.....	8	.....	11
Troy .....	Nov., 1907	4	.....	4	.....	8
.....	April, 1908	2	.....	2	.....	8
Wakefield .....	Feb., 1908	.....	.....	.....	.....	7
Whitefield .....	Feb., 1907	.....	.....	.....	.....	3
.....	Oct., 1907	.....	.....	.....	.....	4
Wilton .....	Feb., 1907	9	.....	9	.....	3
.....	Feb., 1908	2	.....	1	1	3
Winchester and Ashuelot. . .	June, 1907	16	.....	16	.....	6
.....	April, 1908	3	.....	3	.....	7
Windham .....	Nov., 1906	.....	.....	.....	.....	1
.....	May, 1907	.....	.....	.....	.....	1
Woodsville .....	Feb., 1907	.....	.....	.....	.....	2
.....	Oct., 1907	.....	.....	.....	.....	2
Woodstock .....	Oct., 1907	.....	.....	.....	.....	2

The results are summarized in Table No. 3. For purposes of comparison, the results of inspection in former years are given. The term "first tour" is used to designate the first inspection of each town; it covers the years 1901, 1902 and 1903, when inspection was less frequent and less systematic than now.

TABLE No. 3.

CHILDREN.	First tour.	1905.	1906.	1907.	Jan.- June, 1908.
Under 16 years .....	1,292	1,421	1,800	1,745	932
Under 14 years .....	63	8	12	4	.....
Certificated .....	777	1,063	1,683	1,668	891
Percentages certificated .....	60	75	94	96	96
Uncertificated .....	452	350	105	73	41
Number towns and cities .....	61	61	49	60	50
Number establishments .....	260	376	514	771	567

The table given above includes the aggregate number of children found. In some instances in which there has

been more than one inspection during the year, it is probable that the same child has been counted twice. Table No. 2 shows the dates upon which inspection was made and in this table there is no repeated registration, within the ground covered on any one visit.

TABLE No. 4.

## SUMMARY BY INDUSTRIES.

1907.

Number of towns, 61.

Children	Cotton	Shoes	Woolen	Others
Under 16,	782	277	93	477
Under 14,	2	0	0	0
Certificated,	749	270	92	464
Uncertificated,	31	7	1	13
No. of establishments,	93	46	54	491

Table No. 4 shows a summary by industries. For the purposes of this table, the calendar year 1907 is adopted as giving a cross section view. There are no repeated registrations and the table can be taken as showing a true record of the relative number of children employed by the different industries of the state.

The column headed "Others" refers to a large number of different agencies of employment, no one class of which employs more than a very small number of children in the aggregate. Every place in which there seemed to be any likelihood that children might be employed has been visited by the inspector, excepting households and farms. In these there is undoubtedly in the aggregate a considerable amount of child labor, but it is manifestly impracticable to make a house to house canvass of the state. Whenever the department has been informed of such a case it has acted. Some of the employers, other than those

listed in the table, who have been visited are: telephone and telegraph offices, saw mills and pulp mills, news stands, stores, laundries, railroad stations and shops, street trades, and a great variety of other industries.

TABLE No. 5.

## VACATION EMPLOYMENT STATISTICS.

TOWN OR CITY.	Date.	Under 12.	Between 12 and 14.	Number of doubtful legal age.	No. of establishments.
Allenstown .....	Aug., 1908	.....	4	.....	6
Claremont .....	Sept., 1908	.....	.....	.....	11
Derry .....	Sept., 1908	1	3	.....	4
Dover .....	Aug., 1908	.....	27	.....	21
Franklin .....	Aug., 1908	.....	.....	.....	5
Greenville .....	Aug., 1908	.....	.....	.....	1
Laconia .....	Aug., 1908	1	11	.....	13
Lebanon .....	Aug., 1908	.....	2	.....	8
Manchester .....	July, 1908	3	112	1	55
Nashua .....	July, 1908	1	12	.....	18
Newmarket .....	Aug., 1908	.....	23	.....	9
Pittsfield .....	Aug., 1908	.....	1	.....	4
Rochester .....	Aug., 1908	.....	4	.....	12
Rollinsford .....	Aug., 1908	4	18	.....	3
Somersworth .....	Aug., 1908	1	37	.....	8
Total .....		11	254	1	178

During the two years in question no prosecutions have been brought. The cases in which there has been anything more than a technical violation of the law have been very few, as shown in Tables 2 and 5. In several instances I have caused charges to be brought to the attention of prosecuting officers, but the latter have in no case seen fit to prosecute. They have, however, notified the offender that proceedings would be instituted forthwith in case of further delinquency and such action on their part seems to have had all the effect of prosecution and conviction.

The illiterate minor between the ages of sixteen and



twenty-one has been dealt with in part by the evening school. How thoroughly this ground is covered is not known and cannot be known, since we have no means of securing an annual census of such persons. The following table shows the municipalities which have maintained evening schools together with the statistics of the latter.

TABLE No. 6.

## EVENING SCHOOLS.

	Dover	Manchester	Claremont	Concord
Number weeks,	14	12	14	12
Number teachers,	10	24	8	4
Cost,	\$663.30	\$1,445.00	\$200.00	\$592.20
Enrolment,	261	517	92	104
Average attendance,	142	315	47	73

The state inspection furnished by this department, together with more or less efficient local inspection (in some cases the local inspection is very efficient), gives the state in my belief a control of the child labor situation unexcelled by that of any state extensively engaged in manufacturing.

## TRUANCY.

I use this term to include all cases dealt with by this department which do not come specifically within the scope of the child labor phase of the attendance law. In most cases, the intervention of the department has been asked to deal with refractory parents rather than with delinquent children, falling for the most part under chapter 93, section 14 of the Public Statutes.

For the enforcement of this statute, I have employed both Mr. Mitchell, factory inspector, and Mr. Joseph H. Rolfe, of Penacook. Mr. Rolfe's experience as a school



officer well qualifies him to deal intelligently and tactfully and yet forcefully with the class of cases referred to the department. There has been no case which has not yielded to the representations of either Mr. Mitchell or Mr. Rolfe without prosecution. In individual cases I have also commissioned Superintendents Channing Folsom and Austin H. Fittz to act for me.

In response to requests of school boards, superintendents, or teachers, or upon complaint of citizens, I have caused specific cases to be investigated and have secured obedience to the law in the following towns:

Albany,	Lempster,
Aeworth,	Londonderry,
Alexandria,	Lyme,
Amherst,	Milford,
Barrington,	Newbury,
Bartlett,	New Durham,
Candia,	New London,
Charlestown,	Newton,
Chester,	Raymond,
Danville,	Richmond,
Fremont,	Seabrook,
Gilford,	Sutton,
Gorham,	Thornton,
Grafton,	Tilton,
Greenland,	Troy,
Hampton Falls,	Wilton,
Hooksett,	Windham,
Landaff,	

It is worthy of note that nearly three times as many such requests for state intervention have been received and acted upon as during the two years immediately preceding. This fact may be interpreted in three ways: either the school boards are coming to depend more upon the

state department; or they are becoming better informed of their right to call upon the department for assistance; or they are becoming more active in the enforcement of the attendance laws. It is probable that all three factors have been effective. There is ample evidence to show that the mere knowledge that the state can and will act has an effect upon delinquents far beyond that of specific action on the part of this office. In this connection it is also noteworthy that in only two cases have the same towns called upon the department for assistance in 1907-1908 which preferred such requests in 1905-1906.

The regularity of attendance is improving steadily throughout the state. We have to deal rather with a matter of educating parents to know and understand the law than with the punishment of parents for intentional lawlessness. It is hard for many parents to realize that their children are not absolutely their own, to educate or neglect as they please. It seems to many monstrous and even tyrannical that their right to detain their children at home whenever such action will suit their own convenience should be questioned. When their neighbors, members of their local boards, attempt to enforce the law, they are apt to question whether there be any such law. When the state officer appears, the response in a very great proportion of cases is, "Why, if that is the law, I suppose I must obey it."

Only one prosecution has been instituted in this department, that of *State v. Denine*, tried before the local police justice in Troy, and which resulted in acquittal. I have no doubt that the verdict in this case would have been reversed if carried to the higher court, but, the desired result of regular attendance having been gained, it did not seem worth the while to the department to carry the case further.

In pursuance of the policy inaugurated two years ago, I have required the factory inspector in connection with

his other duties to investigate conditions in towns near his regular assignments. In these towns he has visited schools, conferred with school boards, met the local truant officers, instructed them in their duties and in some instances assisted them on particular cases, and distributed copies of the law. I regard this work as useful and important. I have refrained from carrying it to a larger number of towns because of lack of funds. While the superintendent is authorized to appoint agents for the enforcement of the attendance laws at his discretion, such agents must be paid from the contingent funds in the hands of the governor and council, and the payments for work already undertaken are very largely in excess of amounts expended under the former administration. The list of towns just referred to is as follows:

Andover.	Gilsum,	Sullivan,
Ashland.	Hampstead,	Surry,
Auburn,	Hancock,	Swanzy,
Barnstead.	Harrisville,	Temple,
Bennington,	Woodsville,	Troy,
Bristol,	Hill,	Wakefield,
Brookline,	Jaffrey,	Walpole,
Canaan,	Lincoln,	Warner,
Chesterfield,	Mason,	Westmoreland.
Conway,	New Ipswich.	Whitefield.
Dublin.	Richmond,	Woodstock.
Epsom,	Rindge,	

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## CHAPTER V.

### APPROVAL OF SECONDARY SCHOOLS.

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The understanding of chapter 96, Session Laws of 1901, in accordance with which schools have been approved

during the past two years, is recorded in the last biennial report of this office together with conditions of approval. The latter are set forth in a leaflet which is sent to any person interested upon application.

Report upon the work and conditions of secondary education in the state is given in Part II of this volume, including statistics relating to secondary schools.

On November 22, 1906, I approved a two years' course for the Canaan High School for the year ending July 15, 1907. The school failed to make any report of its work at the close of that school year and it was consequently not approved for the following year. The district having given the school statutory establishment by vote, it has been approved for the year ending July 15, 1909.

The institutions named in the following list, upon proof of standing maintained during the year 1906-1907, were approved for the school year ending July 15, 1908.

#### LIST OF APPROVED SECONDARY SCHOOLS, 1907-1908.

Alton High School,	Derry, Pinkerton Academy,
Amherst High School, <i>Two</i>	Dover High School,
<i>years,</i>	Enfield High School, <i>Two</i>
Andover, Proctor Academy,	<i>years,</i>
Antrim High School,	Epping High School,
Atkinson Academy,	Exeter High School, <i>Three</i>
Berlin High School,	<i>years,</i>
Bethlehem High School,	Exeter, Robinson Seminary,
Bristol High School, <i>Two</i>	Farmington High School,
<i>years,</i>	Franconia, Dow Academy,
Claremont, Stevens High	Franklin High School,
School,	Gilmanton Academy,
Colebrook Academy,	Goffstown High School,
Concord High School,	Gorham High School,
Penacook High School,	Hampstead High School,
St. Mary's School,	Hampton Academy,

Hanover High School,	New Ipswich, Appleton
Haverhill Academy,	Academy.
Henniker High School,	New London, Colby Acad-
Hillsborough High School,	emy.
Hinsdale High School,	Newmarket High School,
Holderness School for Boys,	Newport High School,
Hopkinton High School,	Northwood Center, Coe's
Contoosook,	Academy.
Keene High School,	Pembroke Academy.
Kingston, Sanborn Seminary.	Peterborough High School,
Laconia High School,	Pittsfield High School,
Lancaster High School,	Plymouth High School,
Lebanon High School,	Portsmouth High School,
Lisbon High School,	Rochester High School,
Littleton High School,	Somersworth High School,
Manchester High School,	Strafford Center, Austin-
Marlborough High School,	Cate Academy.
Meredith High School, <i>Two</i>	Stratford High School,
<i>years.</i>	Tilton Seminary.
Meriden, Kimball Union	Troy High School, <i>One year,</i>
Academy.	Walpole High School,
Merrimaek, Reed's Ferry,	Warner, Simonds Free High
McGaw Institute,	School,
Milford High School,	Whitefield High School,
Milton, Nute High School,	Wilton High School,
Nashua High School,	Winchester High School,
New Boston High School,	Woodsville High School.
New Hampton Literary In-	
stitute,	

At the close of the school year ending July 15, 1908, the Amherst high school, offering a two years' course, was refused reapproval because of failure to do the work called for in the course of study submitted by the school board and approved by this office.

Approval was also refused to the Goffstown high school,

offering a four years' course, because of failure to accomplish the work called for in its program, a failure attributable in the main to gross disorder and insubordination among the pupils, and because of neglect of reasonable admission qualifications.

During the year the academic department of St. Anselm's College, Manchester, was approved until July 15, 1908, as a school of secondary standing.

The institutions named in the following list, upon submission of proofs of work done and standard maintained, have been approved for the year ending July 15, 1909.

LIST OF APPROVED SECONDARY SCHOOLS, 1908-1909.

Alton High School,	Dover High School,
Andover, Proctor Academy,	Epping High School,
Antrim High School,	Exeter High School,
Atkinson Academy,	Robinson Seminary,
Bath High School, <i>Two</i>	Farmington High School,
<i>years,</i>	Franconia, Dow Academy,
Berlin High School,	Franklin High School,
Bethlehem High School,	Gilmanton Academy,
Boscawen High School, <i>One</i>	Gorham High School,
<i>year,</i>	Hampstead High School,
Bristol High School, <i>Two</i>	Hampton Academy,
<i>years,</i>	Hanover High School,
Canaan High School, <i>Two</i>	Haverhill Academy,
<i>years,</i>	Henniker High School,
Claremont, Stevens High	Hillsborough High School,
School,	Hinsdale High School,
Celebrook Academy,	Holderness School for Boys,
Concord High School,	Hopkinton High School,
Penacook High School,	Contoosook,
St. Mary's School,	Jaffrey (East), Conant High
Derry, Pinkerton Academy,	School,



Keene High School,	New London, Colby Acad-
Kingston, Sanborn Semi-	emy,
nary,	Newmarket High School,
Laconia High School,	Newport High School,
Lancaster High School,	Northwood Center, Coe's
Lebanon High School,	Academy,
Lebanon (West) High School,	Pembroke Academy,
Lisbon High School,	Peterborough High School,
Littleton High School,	Pittsfield High School,
Manchester High School,	Plymouth High School,
Manchester, St. Anselm's	Portsmouth High School,
College,	Rochester High School,
Marlborough High School,	Somersworth High School,
Meredith High School, <i>Two</i>	Strafford Center, Austin-
<i>years,</i>	Cate Academy,
Meriden, Kimball Union	Stratford High School,
Academy,	Tilton Seminary,
Merrimack, Reed's Ferry.	Troy High School,
McGaw Institute,	Walpole High School.
Milford High School,	Warner, Simonds Free High
Milton, Nute High School.	School,
Nashua High School,	Whitefield High School,
New Boston High School.	Wilton High School,
New Hampton Literary In-	Winchester High School,
stitution,	Woodsville High School.
New Ipswich, Appleton	
Academy,	

## CHAPTER VI.

FORMATION OF SUPERVISORY UNIONS.

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I have forwarded to the best of my ability and available time favorable votes by districts accepting the provisions of chapter 77, Laws of 1899, relating to the professional supervision of schools, and union of towns so voting.

For the first of the above purposes, I have met school boards and citizens in conference, have corresponded with a much larger range of school officials and citizens, have issued and mailed a large amount of literature explaining the law and the benefits to be derived, and have addressed numerous audiences in regard to the measure. During the two years thirty-three districts have voted favorably, and six new unions have been organized. During the same period seven towns previously in districts have rescinded their votes, and one town previously rescinded has reconsidered its rescission and is now a part of a new union.

A large proportion of the time given to the formation of new unions in the period 1905-1906 I have been obliged during the past two years to devote to negotiating the re-arrangement of unions made necessary chiefly by the additional towns voting. In all but one of the seven new unions formed I have taken the initiative and have called and been present at the first meetings of the joint advisory boards.

A fuller account of the present condition of the schools of the state with respect to professional supervision will be found in Part II.



## CHAPTER VII.

## STATE TEACHERS' EXAMINATIONS.

I have held or caused to be held six examinations for the state teacher's certificate, as follows:

				SUPERVISORY.		ELEMENTARY.	
				No. taking.	No. completed.	No. taking.	No. completed.
1907	March 29, 30....	Concord.....		4	3	.....	.....
	June 26, 27....	Concord.....		2	2	1	1
	August 26, 27....	Plymouth.....		8	7	3	.....
1908	March 27, 28....	Concord.....		3	.....	.....	.....
		Newport.....		.....	.....	6	.....
	June 26, 27....	Concord.....		5	4	6	1
		Orford.....		.....	.....	4	.....
		Woodsville.....		.....	.....	2	2
	August 28, 29....	Plymouth.....		4	2	2	1

No candidates for the high school teacher's certificate appeared, and it is doubtful if a single high school teacher has been examined by any authority, local or state, during the two years.

The examinations at Newport, Orford, Woodsville, and Warren were conducted simultaneously with those held at Concord, the papers used being the same, by Messrs. Sutcliffe, Carpenter, and Reynolds, district superintendents, who had persuaded some of their more ambitious teachers to prepare themselves.

The principal of the state normal school is constituted a regular examiner for this department, and graduates of the regular course at the normal school, upon filing proof that their final standing is the equivalent of that required for certification at other examinations, are granted certificates of the appropriate grade.

I have prepared during the past year complete syllabi

and reference lists for the guidance of persons preparing for examination.

The following is a summary of the results of examinations since 1895, the date of the enactment of the present law:

Total number examined.....	827
Permanent certificates granted:	
By graduation from Normal school.....	362
By other examinations.....	121 483
Failures, or work never completed.....	340

Excepting district superintendents, who are obliged by law to hold the state certificate, there is little to incite the teacher to secure a state certificate. True, the state certificate is valid throughout the state and exempts its holder from local examinations; but since local examinations are rarely given, not even this motive is a compelling one.

A list of persons holding state teachers' certificates is given in an appendix to this report. Rules and regulations and other information are published separately and will be sent to any interested person upon application.

## CHAPTER VIII.

### TEACHERS' INSTITUTES.

(P. S. Chapter 94, Sections 4-8.)

SECTION 4. He (the superintendent) shall organize, superintend, and hold at least one teachers' institute each year in each county of the state, and appoint the time and place, and make suitable arrangements therefor.

SECT. 5. In case he is unable for any cause to conduct in person any institute, or to make the necessary arrange-

ments therefor, he shall appoint the principal of the state Normal school, or some other suitable person, for that purpose.

SECT. 6. The state treasurer is authorized and instructed to invest, as a permanent institute fund, the proceeds of the sale of the state lands effected under the authority of a joint resolution approved June 28, 1867, and the annual income thereof is set apart for the support of teachers' institutes.

SECT. 7. The superintendent of public instruction may draw upon the state treasurer each year for such part of said income as may be required to defray the necessary expenses of the institutes, and for procuring suitable instruction and lecturers for the same.

SECT. 8. His account for the expenses of the institutes shall be audited each year by the governor and council, and he shall incorporate in his annual report a report of the institutes and of the expenses of the same.

The law relating to teachers' institutes is in reality a survival from an earlier and partially obsolete set of conditions. Teachers' institutes sprang up during the first half of the nineteenth century, before any appreciable equipment of normal or other training schools had been established. They became in part a substitute for normal training, in part a means of arousing public interest in education, in part conferences of teachers and school officials for professional improvement.

As the practice in institutes has come down to us it has preserved entire all these characteristics, and in administering the fund I have aimed to develop and apply this traditional conception to new conditions. I have held the following classes of institutes:

I. The Institute for Common Schools. This is commonly a one-day meeting consisting usually of six practical lectures upon various phases of teaching. It is designed

especially for country towns in which the proportion of trained teachers is small, and which are often without professional supervision.

Forty-five such institutes have been held during the two years. In connection with twenty-three of these, evening meetings have been held chiefly for the public. At each of the two day sessions, which are designed entirely for teachers, many citizens interested in school work have been in attendance.

Numerically, institutes of this class outrun those of other classes.

II. Association Meetings in connection with Institutes. There are in the state eight associations of teachers for mutual improvement other than local, as follows:

Rockingham County Teachers' Association.

Strafford County Teachers' Association.

Carroll County Teachers' Association.

Merrimack Valley Teachers' Association.

Cheshire County Teachers' Association.

Ammonoosuc Valley Teachers' Association.

Winnepesaukee Teachers' Association.

Sullivan County Teachers' Association.

It has for some years been the practice for the department to pay for the cost of one meeting per year, or for one-half the cost of one meeting, if only one is held. These meetings are attended chiefly by the better educated teachers, and in this attendance is a considerable proportion of trained and supervised teachers. It has been my aim to make these meetings in the main inspirational in character by employing as speakers persons capable of interpreting upon a high plane the daily work and life of the teacher, or competent to inform teachers of the changes in good pedagogical practice. I have also so arranged the aid of the department as to encourage the production of the principal part of the programme of that meeting which

is conducted by the association alone, by the members of the association, believing it to be important to develop leadership of this kind.

III. The Summer Institute. This has been a two weeks' study of principles in teaching under the guidance of the most competent lecturers obtainable. It has also been an admirable opportunity for informal professional conference, stimulating and useful in a high degree. It has commonly been attended by about one hundred and twenty-five of the most progressive teachers and superintendents.

During the summer just passed, it seemed to me wise to discontinue such part of the summer institute as was concerned chiefly with the common school teacher. The normal school had instituted a summer session of eight weeks which would be much more effective than the institute in the direction which the latter had taken, and it would doubtless be a waste to duplicate. I therefore turned over to the principal a portion of the money used for maintaining the institute, to be applied by him to the support of the summer session of the normal school, and I have constituted the latter a regular institute of this department.

I have also continued that portion of the work of the old summer institute, which applied more particularly to superintendents, as a conference of superintendents held at Plymouth for the last week in August. I have aimed at this conference to call together the men who are new to the field of supervision in New Hampshire, to instruct them in the school law of the state, the duties which they will have to perform, and the problems which they will have to solve.

IV. Superintendents' Conferences. Twice annually, in December and in March, I have held conferences of superintendents of the state, at Concord in December and at

Plymouth in March. These conferences have been devoted to hard and prolonged work for five half-days, counting two evening sessions as half-days. The first three such conferences were devoted to instruction and discussion of the routine administrative work of the superintendent's office; the fourth was the beginning of a minute and laborious consideration of the programme of studies, which will be continued at future meetings.

The unanimous verdict of the superintendents attending these conferences seems to be that they have proven to be of great practical benefit to the superintendents; and I believe them to be of great value in the direction of unifying the school work of the state.

Inasmuch as no other expenses were involved and no other speakers paid, and inasmuch as all superintendents take an active part in the discussions, I have deemed it proper to pay the expenses of superintendents attending the conference.

V. School Board Conferences. I have the past year extended the institute system so as to reach the local school authorities themselves. Arrangements were made for institutes for school boards in each of the ten counties of the state; in Grafton and Rockingham, owing to their large area, it was found convenient to hold in the case of the former three and in that of the latter two different institutes. The meetings were appointed for that time of year at which busy people, especially in the rural sections, are supposed to be most at leisure, and the attendance was on the whole gratifying.

The program of all the meetings were substantially the same, dealing in the main with the practical difficulties met by the local board and with needed legislation. In almost every meeting, an interesting and useful discussion of the various topics followed, in which the attendants took an active part. This was particularly true of the conferences held at Concord, Exeter and Keene.



The attendance is given in detail in the general summary of institute statistics at the close of this chapter. The meetings at Ossipee, Hillsborough and Newport unfortunately occurred on the same days as three of the heaviest of the fall rains. As a result, the first two meetings named were very slimly attended. In spite of the rain, the Newport meeting showed one of the highest percentages of attendance of the series. One lady, Miss Esther Chatterton, of the Acworth board, drove unattended in the early morning and a pouring rain a distance of between fifteen and twenty miles over hilly and at that time dangerous roads to be present at the institute, and another member, Honorable Charles McDaniel, of Springfield, had an almost equal distance to drive in returning home. The cities of Concord, Portsmouth, Keene, Dover and Somersworth were well represented at their respective meetings. Manchester, Berlin and Nashua were conspicuous for lack of representation.

To sum up: The institute system has reached (1) 2,100 different teachers in the public schools; (2) all the superintendents; (3) twenty-six per cent. of the membership of school boards; and (4) approximately 2,500 citizens who are interested in our schools, chiefly in the rural towns.

A gap left in the area covered by the institutes is the high schools and academies. The high and common schools have been for years included in the same institutes. It has become impracticable, however, to cover the whole ground in any one institute and the institute programs have therefore come to be aimed at the common schools. High school teaching has in consequence suffered. A high school institute for the state was for several years held annually at Concord, but it was given up partly because it did not reach teachers in the remoter schools, and partly because it was felt to be undesirable to duplicate the Hanover conference occurring about the same time.

The gap referred to has been filled to some extent by the annual conference of secondary schools held in the month of May by Dartmouth College at Hanover. This meeting has not, however, been found well adapted to the needs of teachers in the smaller high schools, and it is, of necessity, perhaps, devoid of the purely pedagogical features most needed by high school teachers. In short, it is a conference and not an institute. I expect, therefore, to hold high school institutes at different points in the state during the fall term, designed purely for instruction in the art of teaching.

The record shows that the institute still has a place in our public school system. It ought to be remembered, however, that this place is not a permanent one. As more and more towns come under supervision, and as a larger proportion of teachers are trained, the institute as such will become less and less needed, until finally it should be abolished, its place ultimately being taken by professional associations of teachers. It ought not to be thought that the teachers' institute can be made a substitute for professional supervision or for normal school training.

At many institutes, particularly those held in the cities, a considerable number of teachers attend who have no interest in the institute, who attend simply as a means of securing a holiday, who interrupt the sessions if allowed to do so, and who desert as soon as convenient. Of the honesty of such persons there can be but one opinion. This department cannot control them; the school board can. The school board ought to deal severely with any of its teachers known to be so acting.



TABLE No. 7.

STATISTICS OF TEACHERS' INSTITUTES FROM JUNE 1, 1906, TO  
AUGUST 31, 1907.

Number.	Town.	County.	Dates.	Towns repre- sented.	Teachers in attendance.	Cost.
1	Gorham.....	Coos .....	June 1	9	46	\$62.58
2	Centre Harbor.....	Belknap .....	Sept. 21	6	27	40.11
3	Freedom.....	Carroll .....	Sept. 27, 28	8	27	21.26
4	Candia (East)...	Rockingham..	Oct. 12	6	28	44.31
5	Nottingham .....	Rockingham..	Oct. 26	5	23	41.82
6	Stark .....	Coos .....	Oct. 30	5	30	35.59
7	Jefferson.....	Coos .....	Oct. 31	2	22	32.25
8	Keene.....	Cheshire.....	Nov. 2	21	165	87.21
9	Danbury.....	Merrimack...	Nov. 7	10	35	31.84
10	Franconia.....	Grafton .....	Nov. 9	6	44	52.10
11	Madison.....	Carroll .....	Nov. 15, 16	9	45	59.32
12	Farmington .....	Strafford.....	Nov. 23	8	94	83.36
13	New Ipswich...	Hillsborough.	Dec. 7	4	11	38.07
14	Pittsfield.....	Merrimack....	Dec. 14	6	39	35.31
15	Meriden.....	Sullivan .....	Jan. 4	4	21	48.96
16	Piermont.....	Grafton .....	Jan. 11	6	29	39.11
17	Stratham.....	Rockingham..	Jan. 12	14	32	20.00
18	Newton.....	Rockingham..	Jan. 25	7	30	40.71
19	Belmont.....	Belknap .....	Feb. 1	6	15	34.58
20	Hill .....	Merrimack...	Feb. 8	9	23	33.51
21	Portsmouth....	Rockingham..	May 3	23	146	27.27
22	Ashland .....	Grafton .....	May 24	17	82	51.22
23	Nashua.....	Hillsborough.	May 31	21	341	48.99
	Day institutes, total.....			212	1,355	\$1,009.48
1906	Summer insti- tute.....	Plymouth.....	Aug. 13-24	55	141	1,081.37
1907	Summer insti- tute.....	Plymouth.....	Aug. 12-24	50	124	587.43
				317	1,620	\$2,678.28

TABLE No. 8.

STATISTICS OF TEACHERS' INSTITUTES FROM SEPTEMBER 1,  
1907, TO AUGUST 31, 1908.

Number.	Town.	County.	Date.	Towns repre- sented.	Teachers in attendance.	Cost.
1	Greenfield .....	Hillsborough.	Sept. 20	12	103	\$29.16
2	Contoocook .....	Merrimack ...	Sept. 23	11	62	29.59
3	Aeworth .....	Sullivan .....	Sept. 26	4	17	45.10
4	Cornish .....	Sullivan .....	Sept. 27	2	11	44.63
5	Northwood .....	Rockingham .	Sept. 30	9	24	36.12
6	Londonderry ..	Rockingham .	Oct. 4	7	63	33.66
7	Hampton .....	Rockingham .	Oct. 11	16	55	29.90
8	Danbury .....	Merrimack ...	Oct. 21	9	41	44.96
9	East Jaffrey ...	Hillsborough .	Oct. 25	6	36	41.94
10	Webster .....	Merrimack ...	Oct. 28	4	10	34.30
11	Sandown .....	Rockingham .	Nov. 1	8	25	28.09
12	Walpole .....	Cheshire .....	Nov. 8	9	74	40.28
13	Thornton .....	Grafton .....	Nov. 15	8	30	55.74
14	Somersworth...	Strafford .....	Nov. 22	12	146	55.80
15	Enfield .....	Grafton .....	Dec. 10	4	35	58.99
16	Claremont .....	Sullivan .....	Jan. 31	10	72	7.65
17	Littleton .....	Grafton .....	Feb. 7	12	85	97.42
	*Danbury .....	Merrimack ...	March 3	3		17.25
18	North Stratford	Coos .....	April 24	7	42	73.41
19	Manchester ....	Hillsborough .	May 1	26	400	84.02
20	Exeter .....	Rockingham .	May 4	21	125	10.75
21	Bartlett .....	Carroll .....	May 8	4	18	45.21
22	Laconia .....	Belknap .....	May 22	15	112	56.54
	Day institutes, total .....			216	1,586	\$1,000.51
1908	Summer insti- tute .....	Plymouth .....	July 7 to Aug. 28	36	62	670.35
				252	1,648	\$1,670.86

\*Evening meeting only.

TABLE No. 9.

STATISTICS OF SUPERINTENDENTS' INSTITUTES FROM JUNE  
1, 1906, TO AUGUST 31, 1907.

Number.	Town.	County.	Dates.	Towns repre- sented.	Superintend- ents in at- tendance.	Cost.
1	Concord .....	Merrimack ...	Nov. 30, Dec. 1	50	21	\$26.09
2	Plymouth .....	Grafton .....	March 28, 29, 30	47	17	24.60
				97	38	\$50.69

TABLE No. 10.

STATISTICS OF SUPERINTENDENTS' INSTITUTES FROM SEPTEMBER  
1, 1907, TO AUGUST 31, 1908.

Number.	Town.	County.	Dates.	Towns repre- sented.	Superintend- ents in at- tendance.	Cost.
1	Concord .....	Merrimack ...	Dec. 27, 28	53	21	\$56.30
2	Plymouth .....	Grafton .....	March 26-28	57	24	152.90
3	Plymouth .....	Grafton .....	Aug. 24, 28	57	29	72.65
	Total .....			167	74	\$281.85

TABLE No. 11.

STATISTICS OF SCHOOL BOARD INSTITUTES FROM SEPTEMBER  
1, 1907, TO AUGUST 31, 1908.

Number.	Town.	County.	Dates.	Districts represented.		School offi- cers in at- tendance.	Cost.
1	Littleton .....	Grafton.....	Oct.	2	9	17	\$24.90
2	Ossipee .....	Carroll.....	Oct.	8	5	8	39.95
3	Lancaster.....	Coos.....	Oct.	9	7	13	27.54
4	Laconia .....	Belknap.....	Oct.	15	10	17	35.89
5	Plymouth .....	Grafton.....	Oct.	16	13	15	32.60
6	Exeter .....	Rockingham..	Oct.	23	14	22	25.75
7	Hillsborough..	Hillsborough..	Oct.	29	4	7	24.72
8	Keene .....	Cheshire.....	Oct.	30	15	33	17.62
9	Newport .....	Sullivan.....	Nov.	7	9	22	17.75
10	Lebanon .....	Grafton.....	Nov.	12	11	21	39.68
11	Salem .....	Rockingham..	Nov.	19	6	14	20.61
12	Rochester.....	Strafford.....	Nov.	21	10	22	16.28
13	Concord .....	Merrimack....	Nov.	26	23	39	16.28
				136		250	\$351.44

TABLE No. 7.

SUMMARY FOR 1906-1907.

Teachers' institutes .....	25
Attendance .....	1,602
Cost .....	\$2,678.28
Superintendents' institutes.....	2
Attendance .....	38
Cost .....	\$50.69
Total:	
Institutes .....	27
Attendance .....	1,640
Cost .....	\$2,728.97

SUMMARY FOR 1907-1908.

Teachers' institutes .....	25
Attendance .....	1,648
Cost .....	\$1,670.86

Superintendents' institutes .....	3
Attendance .....	74
Cost .....	\$281.85
School board institutes.....	13
Attendance .....	250
Cost .....	\$351.44
Total:	
Institutes .....	40
Attendance .....	1,972
Cost .....	\$2,304.15
Total.	
Attendance .....	1,702
Cost .....	\$2,145.43
1904-05	1,769
1905-06	1,640
1906-07	1,972
1907-08	\$2,304.15

TABLE No. 12.

Towns represented at institutes.

Towns.	Number of Institutes.	Towns.	Number of Institutes.
Acworth.	2	Bath.	5
Albany.	2	Bedford.	1
Alexandria.	1	Belmont.	3
Allenstown.	17	Bennington.	2
Alstead.	7	Berlin.	8
Alton.	5	Bethlehem.	3
Amherst.	7	Boscawen.	13
Andover.	5	Bow.	1
Antrim.	8	Bradford.	1
Ashland.	7	Brentwood.	1
Atkinson.	5	Bridgewater.	5
Auburn.	3	Bristol.	2
Barnstead.	4	Campton.	8
Barrington.	5	Canaan.	6
Bartlett.	2	Candia.	4

Canterbury,	1	Fremont,	4
Centre Harbor,	3	Gilford,	3
Charlestown,	9	Gilmanton,	4
Chester,	4	Gilsum,	2
Chesterfield,	1	Goffstown,	5
Chichester,	3	Gorham,	2
Claremont,	8	Grafton,	2
Colebrook,	11	Greenfield,	1
Columbia,	7	Greenland,	7
Concord,	16	Greenville,	4
Conway,	4	Groton,	1
Cornish,	5	Hampstead,	2
Croydon,	2	Hampton,	3
Danbury,	4	Hampton Falls,	4
Danville,	1	Hancock,	3
Deerfield,	4	Hanover,	7
Deering,	3	Harrisville,	2
Derry,	9	Haverhill,	10
Dorchester,	11	Hebron,	1
Dover,	7	Henniker,	5
Dublin,	6	Hill,	9
Durham,	2	Lebanon,	11
East Kingston,	5	Lempster,	2
Easton,	1	Lincoln,	3
Eaton,	1	Lisbon,	4
Effingham,	1	Litchfield,	3
Enfield,	8	Littleton,	10
Epping,	7	Londonderry,	4
Epsom,	2	Loudon,	2
Exeter,	7	Lyme,	4
Farmington,	2	Lyndeboro,	1
Fitzwilliam,	6	Madbury,	1
Francestown,	2	Madison,	2
Franconia,	9	Manchester,	8
Franklin,	10	Marlborough,	3
Freedom,	3	Marlow,	4

Mason,	1	Plainfield,	4
Meredith,	8	Plaistow,	5
Merrimack,	4	Plymouth,	10
Middleton,	2	Portsmouth,	7
Milan,	1	Randolph,	3
Milford,	6	Raymond,	5
Milton,	6	Richmond,	4
Monroe,	3	Rindge,	6
Moultonborough,	1	Rochester,	11
Nashua,	6	Rollinsford,	2
Nelson,	1	Rumney,	2
New Boston,	2	Rye,	7
Newbury,	3	Salem,	5
Newcastle,	1	Salisbury,	3
Newfields,	6	Sanbornton,	5
New Hampton,	4	Sandown,	1
New Ipswich,	1	Sandwich,	2
New London,	4	Seabrook,	3
Newington,	5	Somersworth,	3
Newmarket,	11	South Hampton,	5
Newport,	6	Springfield,	3
Newton,	6	Stark,	2
Northfield,	3	Stewartstown,	1
North Hampton,	6	Stoddard,	2
Northumberland,	11	Stratford,	5
Northwood,	3	Stratford,	11
Nottingham,	3	Stratham,	11
Orange,	1	Sullivan,	2
Orford,	12	Sunapee,	4
Ossipee,	3	Sutton,	3
Pelham,	5	Swanzey,	7
Pembroke,	7	Tamworth,	2
Peterborough,	8	Thornton,	4
Piermont,	10	Tilton,	11
Pittsburg,	1	Troy,	5
Pittsfield,	10	Tuftsborough,	3



Hillsborough,	8	Unity,	3
Hinsdale,	2	Wakefield,	8
Holderness,	5	Walpole,	6
Hollis,	3	Warner,	6
Hooksett,	5	Warren,	8
Hopkinton,	5	Weare,	2
Hudson,	7	Webster,	3
Jackson,	2	Wentworth,	1
Jaffrey,	1	Westmoreland,	7
Jefferson,	2	Whitefield,	5
Keene,	6	Wilmot,	3
Kensington,	3	Wilton,	7
Kingston,	3	Winchester,	3
Laconia,	9	Windham,	3
Lancaster,	6	Wolfeboro,	6
Langdon,	5	Woodstock,	5

TABLE No. 13.

Towns represented at no institute during two years.

Benton,	Lyman,
Brookfield,	Mont Vernon,
Brookline,	New Durham,
Carroll,	*Roxbury,
Chatham,	Sharon,
Clarksville,	Shelburne,
Dalton,	Surry,
Dunbarton,	Temple,
Errol,	Washington,
Goshen,	*Waterville,
Grantham,	Wentworth's Location,
Landaff,	Windsor,
Lee,	

TABLE No. 14.

Towns represented at no institute in four years ending August 31, 1908.

Benton,	*Roxbury,
Chatham,	Sharon,
Dunbarton,	Shelburne,
Ellsworth,	Temple,
Errol,	Washington,
Goshen,	*Waterville,
Landaff,	Wentworth's Location.
Mont Vernon,	Windsor.

TABLE No. 15.

## TEACHERS' INSTITUTES.

Showing lists of institute subjects and lecturers from June 1, 1906, to August 31, 1908.

Subjects.	Number of Periods
Primary Methods—Maud Starling,	13
Caroline Wing Parker,	9
Alice S. Mildram,	4
H. L. Grinnell, Jr.,	3
E. L. Silver,	2
Ella L. Sweeney,	1
George H. Whiteher,	10
Arithmetic—James A. MacDougall,	6
H. L. Grinnell, Jr.,	4
E. L. Silver,	3
H. C. Morrison,	2
R. J. Sisk,	2
W. H. Slayton,	1

\*No Schools.

Arithmetic—C. H. Drown,	1
L. J. Rundlett,	1
S. A. Burleigh,	1
F. C. Johnson,	1
History and Civics—Mabel Hill,	15
H. C. Morrison,	5
Blanche Cheney,	2
Willis O. Smith,	2
Channing Sanborn,	1
F. W. Lakeman,	1
W. H. Huse,	1
James A. MacDougall,	1
Henry C. Sanborn,	1
E. L. Silver,	1
H. L. Grinnell, Jr.,	1
L. J. Rundlett,	1
F. C. Johnson,	1
English—H. C. Morrison,	16
Franklin T. Baker,	20
Mabel C. Bragg,	2
Chas. L. Hanson,	1
Georgia B. Chase,	1
M. Catherine Mahy,	1
J. W. Hobbs,	1
Lois D. Beck,	1
Reading and Literature—H. C. Morrison,	16
James A. MacDougall,	
Mabel C. Bragg,	2
M. Catherine Mahy,	2
A. H. Keyes,	1
D. F. Carpenter,	1
S. A. Burleigh,	1
F. C. Johnson,	1
Harriet S. Hayward,	1
Ella L. Sweeney,	1
Frank S. Sutcliffe,	1

## TEACHERS' INSTITUTES.

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Reading and Literature—	Mary McSkimmon,	1
	W. H. Huse,	14
Geography—	George H. Whiteher,	6
	Henry C. Sanborn,	1
	F. C. Johnson,	1
	E. L. Silver,	
Music—	A. J. Abbott,	15
	Burton T. Seales,	20
	W. C. Bates,	1
	Daniel D. Ladd,	1
Nature Study—	Mary C. Breen,	20
	W. H. Huse,	2
	Caroline Wing Parker,	1
	Alice S. Mildram,	1
	George H. Whiteher,	1
Drawing—	Edmund Ketchum,	12
	N. L. Berry,	10
	J. Warren Thyng,	9
	Laura B. McLane,	2
Physiology and Hygiene—	Sarah Coppinger,	3
Writing—	A. H. Keyes,	1
Supervision—	H. C. Morrison,	11
	George Winch,	1
Agriculture—	C. A. Crowell, Jr.,	1
	F. W. Taylor,	2
	W. D. Gibbs,	1
Manual Training—	Fred E. Brown,	1
	George H. Whiteher,	1
School Management—	Charles W. Bickford,	20
	Channing Folsom,	2
	Thomas A. Roberts,	1
Discipline—	F. T. Reynolds,	2
School Law—	Channing Folsom,	20
	H. C. Morrison,	5
Pedagogy—	James E. Klock,	10

Psychology—James E. Klock,	10
History of Education—T. W. Harris,	10
A. Keith Spofford,	10

## GENERAL TOPICS.

Teaching <i>vs.</i> Keeping School—Henry C. Morrison,	1
The Spirit of the School—Henry C. Morrison,	1
Economy of Time in Rural	
Schools—Henry C. Morrison,	1
Some Everyday Opportuni-	
ties of the Teacher—Henry C. Morrison,	1
The School and the Home—Henry C. Morrison,	1
Education for Service—Henry C. Morrison,	1
Securing Results—Henry C. Morrison,	3
Teaching <i>vs.</i> Testing—Henry C. Morrison,	2
Patriotism in the Public	
Schools—Henry C. Morrison,	3
Use of the Program of	
Studies—Henry C. Morrison,	11
The Public Library and the	
Public School—M. C. Smart,	1
Luella A. Dickerman,	2
George Winch,	1
Preparatory Work—Willis O. Smith,	2
L. C. Knapp,	1
Education from a Physical	
Standpoint—W. H. Slayton,	2
A Practical Education—George H. Whitчер,	1
Educational Progress in	
New Hampshire—Channing Folsom,	2
Economy of Time in Rural	
Schools—George H. Whitчер,	3
Schoolhouse Decoration and	
Sanitation—Luella Dickerman,	2
Sarah Coppinger,	2

Schoolhouse Decoration and	
Sanitation—W. H. Huse,	1
Caroline Parker Wing,	1
Thomas A. Roberts,	1
The Gospel of Hard Work—Robert J. Sisk,	2
Temperament—Frank W. Lakeman,	1
Rights at School—Walter H. Small,	4
My Ideal Teacher—Austin H. Keyes,	1
Moral Education—Henry C. Sanborn,	2
Trouble—Wm. C. Bates,	1
The Recitation—Geo. E. Johnson,	1
Horace Mann—Bernard M. Sheridan,	1
Character in Education—Bernard M. Sheridan,	1
Miscellaneous Suggestions	
for Rural Schools—Robert J. Sisk,	1
A Talk to Teachers—E. L. Silver,	1
Education Old and New—W. H. Small,	1
Some Points of Contact Be-	
tween Theory and Practice—Robert J. Sisk,	1
The Backward Pupil—Frank W. Lakeman,	1
School Economy—Harriet C. Kimball,	1
The Future of That Boy—Carroll H. Drown,	1
A Dull School—D. F. Carpenter,	1
The Spoken Word—Craven Laycock,	2
Some Essential Qualities of	
the Superior Teacher—E. L. Silver,	1
Education in Puerto Rico—E. W. Lord,	1
Motor Factors in Elementary	
Education—Lucie E. Pray,	1
Civil Service for Teachers—Harry E. Walker,	1
Some Defects in the School—Payson Smith,	1
A Teacher's Opportunity—H. M. Bisbee,	1
School Gardening—Helen F. Tredick,	1

## EVENING LECTURES.

Good Schools and What They	
Mean to Town and State—Henry C. Morrison,	16

The Meaning of Our Schools	
and Their Needs—Henry C. Morrison,	2
District Supervision—Henry C. Morrison,	1
A Fair Chance for Every	
Child—Henry C. Morrison,	1
Needs of New Hampshire	
Schools—Henry C. Morrison,	1
The Public Schools—Robert J. Sisk,	1
The Schools and the Com-	
munity—Craven Laycock,	1

## TABLE No. 16.

## SUPERINTENDENTS' INSTITUTES.

Showing list of institute subjects and lecturers from  
June 1, 1906, to August 31, 1908.

Foundation Work in a New District.	Channing Folsom
Teachers' Meetings.	H. S. Roberts
The Superintendent's Relation to the Public.	F. S. Sutcliffe
Economy of Time in the Mixed School.	
George H. Whitcher, D. F. Carpenter	
Use of the State Program.	Thomas A. Roberts
Economy in the Management of Text Books.	
Supplies, and Apparatus.	Henry C. Sanborn
Keeping Track of Teachers' Work.	Wm. H. Slayton
Schoolhouse Sanitation and Decoration.	Wm. H. Cummings
Testing and Grading.	James A. MacDougall
Advanced Professional Study for the Work-	
ing Teacher, and Its Application as a Con-	
trol of Salary Schedules.	George H. Whitcher
Testing School Work for Results.	Henry C. Morrison
The Backward Child as a Factor in the	
Efficiency Problem—Some Methods of	
Elimination.	F. C. Johnson



The Apprentice System as a Means of Training High School Graduates as Teachers during limitation of Normal School facilities.

George A. Keith

## TABLE No. 17.

## SCHOOL BOARD INSTITUTES.

Showing list of institute subjects and lecturers from June 1, 1906, to August 31, 1908.

The Problem of Securing and Paying Teachers—Henry C. Morrison,	4
The Consolidation of Rural Schools—Mason S. Stone,	2
Granville T. Fletcher,	6
John T. Prince,	2
Henry C. Morrison,	1
Frank S. Sutcliffe,	1
The Transportation of School Children to Central Schools—Mason S. Stone,	2
Granville T. Fletcher,	6
John T. Prince,	2
Henry C. Morrison,	1
Frank S. Sutcliffe,	1
The Attendance Question—Henry C. Morrison,	12
Promotion—Olive Kimball,	1
Taxation and Revenue for School Purposes—Channing Folsom,	3
Henry C. Morrison,	3
Equalization of the Privi- leges and Burdens of Public Education—Channing Folsom,	2
The Duty of the School Board Member Towards Pro-	

gressive School Legislation—O. H. Toothaker,	3
T. W. D. Worthen,	1
Henry W. Hurd,	2
W. S. Emery,	1
What a Child Should Know at the End of the Common	
School Course—George L. Plimpton,	1
The Teacher Question—George Winch,	3
Henry C. Morrison,	3
A Critical Need of Our Schools—James A. Tufts,	2
The Rural School: Its Im- portance and Its Needs—Herbert O. Hadley,	1
The Problem of Securing and Paying Teachers—Charles W. Bickford,	1
Bertram Ellis,	1
School Finance—Henry C. Morrison,	2
Responsibility of School Boards for Improvement of Professional Standard	
Among Teachers—Charles D. Adams,	1
Need of a Legal Standard for Common Schools, and of Some Authoritative Means of fixing Responsibility for living up to it—George W. Fowler,	1

## CHAPTER IX.

## JAMESTOWN EXHIBITION.

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At the request of the governor, in the spring of 1907, I assumed charge of the collection of an exhibit of the educational work and equipment of the state for the ter-centennial exposition at Jamestown, Virginia. The time available was supposed to be very limited and consequently no elaborate exhibit was planned. As it turned out, delays in forwarding the remainder of the exhibit sent by this state would, if anticipated, have permitted a more adequate educational representation. As forwarded, the educational exhibit of the state was made up as follows:

I. The educational equipment of the state, comprising an excellent collection of photographs illustrating the buildings, grounds and to some extent the life of our institutions as follows:

1. Dartmouth College.
2. The New Hampshire College of Agriculture and the Mechanic Arts.
3. The State Normal School.
4. Phillips-Exeter Academy and St. Paul's School.
5. The public secondary schools, including both high schools and endowed academies, showing types of each.
6. The public elementary schools of the state, showing typical city, village, and rural schoolhouses, both old and new.
7. The School for Feeble-minded Children.
8. The state library and local public libraries.

II. Illustrations, by sample papers and by photographs, of schoolroom work throughout the public school system.

Upon the return of the exhibit from Jamestown, it was set up in the gallery of the state library, where it now is.

## CHAPTER X.

AWARD OF THE EQUALIZATION FUND.

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The law requires that there shall annually be distributed from the state treasury the sum of \$18,750 to all towns having less than \$3,000 of equalized valuation per pupil of average attendance, and that the governor and council upon recommendation of the superintendent of public instruction shall add to such list of towns other towns which from their peculiar conditions need relief from too great a burden of taxation.

The ratio of valuation to pupils in average attendance has so risen that in December, 1907, only sixteen towns fell below the \$3,000 mark. It therefore became the duty of the superintendent to select some fifty or more additional towns for recommendation to the governor and council.

In selecting such towns I have been governed, of course, by the letter and the spirit of the statute. All the poorer towns were included in the list to be recommended unless it appeared that the town, though poor in valuation, was not heavily taxed. I have refused to include any town which could not show itself to be making a vigorous effort for good schools on its own account; and I have invariably cut off any town from this kind of aid which, having received the same in the preceding year, promptly cut down its own appropriation.

A list of the towns receiving a share of the equalization fund is given in the appendix; and working of the equalization is discussed in Part II.

## CHAPTER XI.

REPORT OF THE REGENT OF THE STATE BOARDS OF MEDICAL  
EXAMINERS.

## Registration of Physicians and Surgeons.

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THE LAW.

AN ACT to regulate the licensing and registration of physicians and surgeons.

*Be it enacted by the Senate and House of Representatives in General Court convened:*

SECTION 1. No person shall hold himself out to the public as a physician and surgeon, or advertise as such, or use the title of M. D. or Dr. (or any title which shall show or tend to show that the person using the same is a practitioner of any of the branches of medicine) in New Hampshire after September 1, 1897, unless previously registered and authorized, or unless licensed and registered as required by this chapter; nor shall any person practice medicine and surgery whose authority to practice is suspended or revoked by the regent of the state board.

SECT. 2. Within sixty days after the passage of this act, the governor and council shall appoint three separate state boards of medical examiners, of five members each, so appointed that the term of office of one member shall expire each year, and the members thereafter appointed shall hold office five years, or until their successors are appointed and qualified. One board shall represent the New Hampshire Medical Society, one the New Hampshire Homeopathic Medical Society, and one the New Hampshire Eclectic Society. Each of these three societies shall nominate, an-

nually, twice the number of examiners to be appointed in that year on the board representing it. The names of such nominees shall be annually transmitted, under seal, by the president and secretary, to the governor and council, who shall appoint from such lists the examiners required to form the boards and to fill any vacancy that may occur from expiration of office or otherwise. Each nominee, before appointment, shall furnish to the governor and council satisfactory proof that he has received the degree of doctor of medicine from some registered medical school, and that he has legally practised medicine in this state for at least five years. If no nominees are presented from a society to the governor and council, they may appoint from members in good standing in such society without restriction. The governor and council, upon recommendation of the board, may remove any examiner for misconduct, incapacity, or neglect of duty.

SECT. 3. Every medical examiner shall receive a commission of appointment from the state, and before beginning his term of office shall file with the secretary of state the constitutional oath of office. Each board, or any member thereof, may take testimony and proofs concerning all matters within its jurisdiction. Each board may make any by-laws and rules, not inconsistent with law, necessary in performing its duties.

SECT. 4. The superintendent of public instruction, *ex-officio*, shall be the regent of the state boards of medical examiners, and shall perform such duties as are herein specified.

SECT. 5. From the fees provided by this act, the regent may pay all proper expenses incurred by its provisions, except compensation to medical examiners; and any surplus at the end of any year shall be apportioned equally among the three boards; and the state shall not pay the expenses of said boards, or either of them, or compensate them, or



either of them, for services rendered under their commissions.

SECT. 6. Each board shall annually elect from its members a president and a secretary for the year, and shall hold one or more meetings each year, pursuant to call of the regent, who may also call joint meetings of the three boards or of their officers. At any meeting a majority shall constitute a quorum, but questions prepared by the boards may be grouped and edited, or answer papers of candidates may be examined and marked, by committees duly authorized by the boards.

SECT. 7. The regent shall admit to examination any candidate who pays a fee of \$10 and submits satisfactory evidence, verified by oath, if required, that he,—

1. Is more than twenty-one years of age.
2. Is of good moral character.
3. Has graduated from a registered college; or satisfactorily completed a full course in a registered academy or high school; or had a preliminary education considered and accepted by the regent as fully equivalent.
4. Has studied medicine not less than four full school years, of at least nine months each, including four satisfactory courses, of at least six months each, in four different calendar years, in a medical college registered as maintaining at the time a satisfactory standard. The regent shall accept, as the equivalent for any part of the third and fourth requirements, evidence of five or more years' reputable practice, provided that such substitution be specified in the license.
5. Has either received the degree of bachelor or doctor of medicine from some registered medical school, or a diploma or license conferring full right to practice medicine in some foreign country.

Students who matriculate in a New Hampshire medical school before January 1, 1898, on the prescribed study of



medicine, shall be exempt from this preliminary education requirement.

SECT. 8. Each board shall submit to the regent, as required, lists of suitable questions for thorough examinations in anatomy, physiology and hygiene, chemistry, surgery, obstetrics, pathology and diagnosis, and therapeutics including practice and materia medica. From these lists the regent shall prepare question papers for all these subjects, which at any examination shall be the same for all candidates, except that in therapeutics, practice, and materia medica all the questions submitted to any candidate shall be chosen from those prepared by the board selected by that candidate and shall be in harmony with the tenets of that school, as determined by its state board of medical examiners.

SECT. 9. Examinations for license shall be given at Concord, in this state, and at least twice annually, and shall be exclusively in writing and in English. Each examination shall be conducted by the regent, or a competent examiner appointed by him, who shall not be one of the medical examiners. At the close of each examination the regent or examiner in charge shall deliver the questions and answer papers to the board selected by each candidate, or to its duly authorized committee, and such board, without unnecessary delay, shall examine and mark the answers and transmit to the regent an official report, signed by its president and secretary, stating the standing of each candidate in each branch, his general average, and whether the board recommends that a license be granted. Such report shall include the questions and answers and shall be filed in the public records of the regent. If a candidate fails on first examination, he may, after not less than six months' further study, have a second examination without fee. If the failure is from illness, or other cause satisfactory to the boards, they may waive the required six months' study.

SECT. 10. On receiving from a state board an official report that an applicant has successfully passed the examinations and is recommended for license, the regent shall issue to him a license to practice medicine. Every license shall be issued by the regent under seal, and shall be signed by each acting medical examiner of the board selected, and by the regent, and shall state that the licensee has given satisfactory evidence of fitness, as to age, character, preliminary and medical education, and all other matters required by law, and that after full examination he has been found properly qualified to practice. Applicants examined and licensed by other state examining boards registered by the regent as maintaining standards not lower than those provided by this chapter, and applicants who matriculate in a New Hampshire medical school before January 1, 1898, and who receive the degree M. D. January 1, 1903, may, without further examination, on payment of five dollars to the regent and on submitting such evidence as may be required, receive an endorsement of their licenses or diplomas conferring all rights and privileges of a regent license issued after examination.

Before any license is issued it shall be numbered and recorded in a book kept in the regent's office, and its number shall be noted in the license. This record shall be open to public inspection, and in all legal proceedings shall have the same weight as evidence that is given to a record of conveyance of land.

SECT. 11. (As amended by Chapter 1 of the Session Laws of 1903.) This chapter shall not be construed to affect commissioned medical officers serving in the United States army, navy, or marine hospital service, while so commissioned; or any one while actually serving on the resident medical staff of any legally incorporated hospital; or any legally registered dentist exclusively engaged in practicing dentistry; or any manufacturer of artificial eyes, limbs or orthopedic instruments or trusses in fitting such

instruments on persons in need thereof; or any lawfully qualified physician in other states or countries meeting legally registered physicians in this state in consultation; or any physician residing on a border of a neighboring state and duly authorized under the laws thereof to practice medicine therein, whose practice extends into this state, and who does not open an office or appoint a place to meet patients or receive calls within this state; or to the regular or family physicians of persons not residents of this state, when called to attend them during a temporary stay in the state; neither shall the provisions of this act apply to clairvoyants, or to persons practicing hypnotism, magnetic healing, mind cure, massage, Christian science, so-called, or any other method of healing if no drugs are employed or surgical operations are performed; *provided*, that such persons do not violate any of the provisions of this act in relation to the use of M. D. or the title of doctor or physician.

SECT. 12. Any person who, not being then lawfully authorized to practice medicine within this state and so registered according to law, shall hold himself out to the public as a physician and surgeon, or advertise as such, within this state, without lawful registration or in violation of any provisions of this chapter; and any person who shall buy, sell, or fraudulently obtain any medical diploma, license, record, or registration, or who shall aid or abet such buying, selling, or fraudulently obtaining, or who shall practice medicine under cover of any medical diploma, license, record, or registration illegally obtained, or signed, or issued unlawfully, or under fraudulent representations or mistake of fact in a material regard; and any person who shall append the letters M. D. to his or her name; or shall assume or advertise the title of doctor (or any title which shall show or tend to show that the person assuming or advertising the same is a practitioner of any of the branches of medicine) in such a manner as to convey the impression that he or she is a legal practitioner of medicine,

or of any of its branches, without having legally received the medical degree, or without having received a license which constituted at the time an authority to practice medicine under the laws of this state then in force, shall be guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than one hundred dollars or imprisonment for three months for the first offense; and on the conviction of any subsequent offense, by a fine of not more than two hundred and fifty dollars or imprisonment for not less than six months, or by both fine and imprisonment.

SECT. 13. Every person who is a practitioner of medicine and surgery in this state prior to the passage of this act shall be, upon satisfactory proof thereof to the regent and upon the payment of a fee of one dollar, entitled to registration; and the said regent shall issue to him a certificate signed by himself and the chairman and secretary of such board of medical examiners as the applicant may elect; and said certificate shall state the facts and the cause of said registration, and shall entitle the said person to practice medicine legally in the state of New Hampshire.

SECT. 14. The first meeting of the boards may be called by any one of the members by a notice in writing, stating the time and place of meeting, sent by mail to each of the other members at least one week prior thereto.

SECT. 15. This act shall take effect on its passage.

[Approved March 16, 1897.]

AN ACT to amend Section 14, Chapter 63 of the Laws of  
1907 in Relation to the Practice of Medicine.

*Be it enacted by the Senate and House of Representatives  
in General Court convened:*

SECTION 1. Amend chapter 63 of the Laws of 1897 by adding the following to section 14 of said chapter: Any legal practitioner of medicine and surgery in any other

state or territory, which will grant to physicians and surgeons registered in this state similar privileges, shall be admitted to practice medicine and surgery in this state by paying the usual fee of ten (10) dollars and presenting to the boards of medical examiners a satisfactory diploma from some medical school, a certificate of registration, or license to practice medicine, from the state or territory from which he comes, and evidence satisfactory to said boards of examiners of his professional standing.

[Approved February 20, 1907.]

The examining boards are as follows:

From the New Hampshire Medical Society:

John F. Robinson, M. D., Manchester, term expires 1909.

James T. Greeley, M. D., Nashua, term expires 1910.

Arthur C. Heffenger, M. D., Portsmouth, term expires 1911.

George Cook, M. D., Concord, term expires 1912.

George H. Shedd, M. D., North Conway, term expires 1913.

From the New Hampshire Homeopathic Medical Society:

Henry M. Wiggin, M. D., Whitefield, term expires 1909.

Robert V. Sweet, M. D., Rochester, term expires 1910.

Arthur J. Todd, M. D., Manchester, term expires 1911.

George W. Flagg, M. D., Keene, term expires 1912.

(—————) term expires 1913.

From the New Hampshire Eclectic Society:

A. J. Marston, M. D., Plymouth, term expires 1909.

Lester R. Brown, M. D., Winchester, term expires 1910.

(—————) term expires 1911.

Walter H. True, M. D., Laconia, term expires 1912.

(—————) term expires 1913.

Of the joint board, the president is Dr. Cook, and the secretary Dr. Flagg.

The registered practitioners licensed between October 1, 1906, and October 1, 1908, are classified as follows:

A. In practice in the state prior to the enactment of the law .....	4
B. Admitted by examination.....	41
C. Admitted by endorsement of diploma.....	3
D. Reciprocity with states.....	2
E. Endorsement of state licenses issued upon examination .....	1
Total .....	15

Total number of licenses issued since the enactment of the law is one thousand one hundred and fifty-one; of these, six have been revoked.

Four examinations have been held since October 1, 1906, as shown in the summary which follows:

## SUMMARY OF MEDICAL EXAMINATIONS.

OCTOBER, 1906, TO OCTOBER, 1908.

EXAMINATION.	Date.		Men.	Women.	Regular.	Homeopathic.	Total.	Accepted.	Rejected.
Twenty-second.....	Jan.,	1907	15	2	16	1	17	9	8
Twenty-third.....	July,	1907	15	1	16	0	16	10	6
Twenty-fourth.....	Jan.,	1908	16	0	16	0	16	12	4
Twenty-fifth.....	July,	1908	14	1	14	1	15	10	5
			60	4	62	2	64	41	23

There has been collected from fees and transfers to other states \$833; of this sum, \$475.02 has been required for the expenses of the regent's office; \$100.25 for the expenses of secretary; fees amounting to \$19 have been refunded; and



\$238.73 has been distributed among the three boards as required by law.

A record of the questions proposed at the several examinations is here given.

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## TWENTY-FIRST EXAMINATION.

July 6 and 7, 1906.

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### THERAPEUTICS AND MATERIA MEDICA.

*(N. H. Medical Society.)*

1. Define arterio-sclerosis and outline its treatment.
  2. Give the therapeutics of the early stages of locomotor ataxia.
  3. Write a prescription, containing at least three drugs, for hemorrhage from the bowels in typhoid fever.
  4. Give the materia medica and therapeutics of the three drugs used in the above mentioned prescription.
  5. Give the therapeutics of acute Bright's disease.
  6. Describe hemophilia and outline its treatment.
  7. Outline the treatment of acute dysentery.
  8. Name the simple bitters and give their therapy.
  9. Give the therapeutics of gastric ulcer.
  10. Give treatment of diabetes mellitus.
- 

### MATERIA MEDICA AND THERAPEUTICS.

*(N. H. Homeopathic Society.)*

1. Give diagnosis and treatment of arterio-fibrosis.
2. Give a case of infantile entero-colitis; mention the symptoms for which you would give, (a) mere. corr.; (b) arsenicum; (c) ipecac.



3. Mention your treatment for, (a) acute colitis; (b) acute appendicitis; (c) inguinal hernia, and give differential diagnosis.
  4. Give the characteristic symptoms of *lilium tig.*
  5. Mention the conditions in a case of measles for which you would administer *pulsatilla*.
  6. Mention ten characteristic symptoms of *nux vomica*.
  7. What are the head symptoms calling for administration of *gelseminum*?
  8. Give characteristic symptoms of *cannabis sativa*.
  9. How would you treat a case of syncope?
  10. What is the more common name of *glonoinum*? Give characteristic symptoms.
- 

## MATERIA MEDICA AND THERAPEUTICS.

(*N. H. Eclectic Society.*)

1. In scarlet fever give, (a) period of incubation; (b) first symptoms; (c) characteristics of rash; (d) course of disease; (e) duration of disease.
2. Give a line of treatment for scarlet fever.
3. Mention cases where the following drugs would be indicated: *chinnanthus*, *apocynum*, *gelseminum*, sulphite of soda. Give doses.
4. Mention some of the causes and give treatment for dysmenorrhea.
5. Give diagnosis, symptoms and treatment for cholera infantum.
6. What is acetanilid, and the dose for same? Give its action and when contraindicated.
7. What is the physiological and therapeutic action of belladonna? Give dose.
8. Give the official name of golden seal, and mention indications for its use.

9. Name some of the remedies most used in epilepsy.
  10. What is the dose and action of (a) ergot? (b) codeine?
- 

#### ANATOMY.

1. Name the muscles of the leg that have attachments about the knee joint.
  2. Describe the peritoneum.
  3. Give the origin and distribution of the third pair of cranial nerves.
  4. Give origin, course, branches, and termination of pneumogastric nerve.
  5. Describe fully the relationship of the muscles of the anterior abdominal wall.
  6. Enumerate muscles of the anterior brachial region.
  7. Place and describe the kidney.
  8. Classify the articulations.
  9. Describe the Palmer arch.
  10. Give the course, relations and termination of the female ureter.
- 

#### SURGERY.

1. State causes of chronic intestinal obstruction. Give symptoms, diagnosis and treatment.
2. Give the technique of skin grafting.
3. Give causes, diagnosis and treatment of retention of urine in the male.
4. Give mode of reducing dislocation of the lower jaw.
5. Give operation for hair-lip.
6. Give differential diagnosis between concussion and compression of the brain.

7. Differentiate between a complete inguinal hernia and a hydrocele. Give radical treatment of each.
  8. How would you diagnose tubercular kidney?
  9. What are the symptoms of gall stones?
  10. Enumerate suture materials mostly used and describe the different methods of suturing.
- 

## CHEMISTRY.

1. What dissolved substances would you expect to find in rain water, river water and spring water?
  2. Distinguish between the temporary and permanent hardness of water.
  3. How can hard water be softened?
  4. Explain the chemistry of the reaction which occurs when olive oil is boiled with a solution of caustic soda.
  5. Point out the characteristic differences in the reactions of ferrous and ferric salts. Give the formulæ for ferric and ferrous sulphate.
  6. State the action produced (1) by animals, (2) by plants, on air.
  7. Name test by which arsenic can be detected in stomach contents.
  8. Describe action of lead on water.
  9. Mention the opium alkaloids.
  10. What is meant by a metallic salt?
- 

## OBSTETRICS.

1. Where does vivification of the ovum occur?
2. Mention the process of formation of the chorion and amnion.
3. Trace the left ovarian artery.

4. Why do prophylactic measures play so important a part in bringing about a normal puerperium?
  5. In the albuminuria of pregnancy what treatment should be instituted to prevent eclampsia and avoid premature delivery?
  6. Give the anatomy of the perineum.
  7. How would you manage a case of post-partal hemorrhage?
  8. Give detailed hygiene to be observed in a lying-in case, from the time of your arrival to the delivery of the child.
  9. Define abdominal pregnancy.
  10. Enumerate the symptoms which indicate death of the child in utero, and state what course should be pursued in such a condition.
- 

#### PHYSIOLOGY.

1. What are ferments?
2. Name ferment belonging to human saliva. To gastric juice.
3. What is hemoglobin?
4. What is urea?
5. Describe the physiological action of the bile.
6. What is meant by blood pressure, and at what measurement does it become pathological?
7. Describe your method of vaccination, and how does vaccinia modify smallpox?
8. What is meant by natural ventilation, and how would you accomplish it?
9. Define foods; what is diet?
10. Give the complete hygiene of a case of typhoid fever, patient recovered.

## TWENTY-SECOND EXAMINATION.

January 8 and 9, 1907.

## MATERIA MEDICA AND THERAPEUTICS.

*(N. H. Medical Society.)*

1. Differentiate acute gonorrhœal anthritis from acute articular rheumatism.
2. What is a tincture, a fluid extract, a solution, a mixture?
3. Give symptoms and treatment of simple or uncomplicated ulcer of the stomach.
4. Name three hemostatic drugs, and give the method of action of each.
5. Give a prescription for anorexia containing two or more active drugs and an excipient.
6. Give symptoms and treatment of acute nephritis.
7. Name three diseases that may simulate typhoid fever, and give differential symptoms.
8. What pathological condition is the most frequent predisposing cause of angina pectoris?
9. Name some of the causes of multiple neuritis.
10. Give the symptoms and treatment of croupous (lobar) pneumonia.

## MATERIA MEDICA AND THERAPEUTICS.

*(N. H. Homœopathic Medical Society.)*

1. Give characteristic symptoms of *nux. moenchata*.
2. What tropic changes suggest the use of *mere. corr.*?
3. Upon what tissues does *bryonia* produce its greatest effects?
4. For what conditions and symptoms would you use morphine hypodermatically?

5. Does the law of similars affect the dose of any remedy?
  6. In your opinion does antitoxine cure diphtheria? If so, why?
  7. In what stage of diphtheria should antitoxine be administered?
  8. Give diagnosis and treatment of arterio-fibrosis.
  9. What diet would you recommend in case of chronic interstitial nephritis?
  10. What topical application would you recommend in an ordinary case of croup?
- 

## MATERIA MEDICA AND THERAPEUTICS.

(*N. H. Eclectic Medical Society.*)

1. What is meant by specific medication?
2. In what pathological condition would you expect good results from the administration of quinine? Give dose.
3. Name some of the remedies which are very much in vogue at the present time which were considered worthless thirty years ago by the majority of the profession.
4. Describe and prescribe for acute coryza.
5. Give course of treatment for gonorrhœa from first stage, and give prognosis.
6. Give diagnosis, prognosis and treatment for serous pleurisy.
7. Give diagnosis, prognosis and treatment for purulent pleurisy.
8. What are some of the unfavorable effects of the prolonged use of balsam of copaiba?
9. Give treatment for retention of urine; (*b*) suppression of urine.
10. Differentiate enteritis from appendicitis.

## ANATOMY.

1. Describe the vertebral column.
  2. Give the general anatomy of the brain.
  3. Name and describe the glands of the intestinal tract.
  4. Name the coverings of an oblique inguinal hernia from within outward.
  5. Name all structures severed in an amputation of the thigh at its middle third.
  6. Describe the Y ligament of hip joint.
  7. Enumerate the muscles of the anterior femoral region.
  8. Give origin, course and distribution of the third pair of nerves.
  9. Describe the pleural.
  10. Describe the male perineum.
- 

## SURGERY.

1. What conditions may require joint excision?
2. Describe the treatment of a lacerated wound of the wrist when a part of the tendons, nerves and arteries have been severed.
3. Give diagnosis, prognosis and treatment of intra capsular fracture of the femur.
4. Enumerate dislocations at shoulder joint, and give mode of reduction of each.
5. Describe operative technic of cancer of lower lip.
6. Describe the various operations for hydrocele.
7. Enumerate symptoms of abdominal cancer.
8. Under what circumstances may careful sounding fail to detect stone in bladder? How may vesical calculi be treated, and what circumstances guide you in the choice of operation?
9. Define osteomalacia and give its prognosis and treatment.



10. State complications which may occur in fractured ribs, and give treatment.

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OBSTETRICS.

1. Describe briefly an operation for relaxed pelvic outlet.
2. Name the different kinds of version. Give the indications for their employment.
3. What circumstances, other than pelvic contractions, may cause dystocia?
4. Differentiate between an ovarian cyst and ascites.
5. What signs are brought out by abdominal palpation in the last stages of pregnancy, and their relative value?
6. Give the causes of sterility, and the treatment for the same.
7. Give the etiology, symptoms and treatment for puerperal sepsis.
8. Treatment of recto-vaginal fistula.
9. Describe mastitis after labor, and give treatment.
10. Name the disturbances and disorders incident to the menopause, and give the general outline of treatment.

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CHEMISTRY.

1. Give symptoms and treatment for carbolic acid poisoning.
2. How would you search for corrosive sublimate in the stomach contents?
3. Define a solid, a liquid and a gas.
4. Describe the chemistry of alcohols and ethers.
5. What element is neither acid nor alkaline, yet present in all acids?

6. Define valence, base, dialysis, alloy, a salt.
  7. Give a chemical test for uric acid. What proportion is there in normal human urine?
  8. Show by equation how nitric acid is formed by the action of sulphuric acid on potassium nitrate.
  9. Explain by an equation the action of hydrochloric acid on marble. What officinal compound results?
  10. Give chemistry of respiration, showing what is inhaled, what is exhaled, and how the gases enter and leave the blood.
- 

#### PHYSIOLOGY AND HYGIENE.

1. What are connective tissues, mention all, and how do they resemble each other?
2. Define proteids. What can you say of their importance?
3. What is osmosis? Give example.
4. Describe the spleen, and give its functions.
5. Give the physiology in full of smell.
6. What is the duration of intestinal digestion—i. e., given a portion of food, how long will it be before it is changed into refuse and ready for discharge from the body?
7. Describe your method of vaccination, and how does vaccinia modify smallpox?
8. Define immunity. When is one said to be absolutely immune, and how is it brought about?
9. What is the chief substance that contaminates the air of imperfectly ventilated rooms, and where does it come from?
10. Give the hygienic treatment of a case of diphtheria from start to finish, patient recovered.

## PATHOLOGY AND DIAGNOSIS.

1. Give pathology and diagnosis of pneumonia.
  2. Give differential diagnosis between false and membranous croup.
  3. Describe a case of a cancer of the lung.
  4. Give pathology and diagnosis of retinitis.
  5. Describe the appearance of a heart that has undergone parenchymatous degeneration and give the histology.
  6. Give pathology and diagnosis of jaundice, catarrhal.
  7. Describe a case of general septic peritonitis and mention the possible sources of infection.
  8. Give the pathology of diphtheritic enteritis.
  9. Give pathology of diabetes insipidus.
  10. Ten causes which diminish knee-jerk.
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## TWENTY-THIRD EXAMINATION.

July 9 and 10, 1907.

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## MATERIA MEDICA AND THERAPEUTICS.

(*N. H. Medical Society.*)

1. Name the infectious diseases.
2. Give a clinical description of uremia and name other conditions with which it may be confounded.
3. Name the principal spinal stimulants.
4. Name the exanthematous diseases and give the period of incubation of each.
5. Outline symptoms of acute general peritonitis, name some of its causes and give medicinal treatment.
6. Name the principal heart stimulants.
7. Define erysipelas, give its local and constitutional symptoms and general treatment.

8. Outline the symptoms and treatment of cholera infantum.
  9. Define septicemia.
  10. Outline the symptoms of chronic gastritis (gastric catarrh), give some of its causes and its treatment.
- 

## MATERIA MEDICA AND THERAPEUTICS.

(*N. H. Eclectic Medical Society.*)

1. Give diagnosis and treatment for acute indigestion.
  2. Give diagnosis, prognosis and treatment for mucous colitis.
  3. What special remedies would be indicated in a case where there is high temperature, full and bounding pulse, flushed face and contracted pupils?
  4. Write a prescription and give method of treatment for acute articular rheumatism.
  5. Name a diaphoretic; a diuretic; an arterial sedative; a nerve sedative.
  6. What medicines have a special action upon the female generative organs?
  7. Describe tonsilitis and mention a course of treatment.
  8. Differentiate suppression and retention of urine and give treatment for each.
  9. From what is salicylate of soda and salicylic acid made and for what are they principally used?
  10. Common name, preparation, doses and therapeutic action of leptandra; juglans; podophyllum.
- 

## ANATOMY.

1. What is the name, function, and distribution of the fifth cranial nerve?

2. Give the exact location of the vermiform appendix.
  3. Give the anatomy of the ear in detail.
  4. Enumerate the muscles of the larynx.
  5. Describe and give relations of brachial artery.
  6. Describe the biliary passages.
  7. Differentiate anatomically in detail, between the large and the small intestines.
  8. Give the length and course of the female ureters.
  9. What kind of a joint is the elbow and what structures are about it?
  10. Describe hip joint.
- 

## SURGERY.

1. Give pathological steps of inflammation.
  2. Give preparative technique for abdominal section.
  3. Enumerate varieties of fractures.
  4. Diagnose and treat dislocation of hip.
  5. Describe amputation through forearm.
  6. How should a penetrating wound of the knee joint be treated?
  7. Give symptoms of intestinal perforation and describe operative procedure for relief.
  8. Give different methods of controlling hemorrhage and describe your treatment of punctured wound of radial artery at the wrist.
  9. Differentiate between cancer of intestine, tubercular peritonitis and obstruction of portal vein.
  10. Into how many classes are burns divided? Name each and give treatment.
- 

## OBSTETRICS.

1. State cause of obstinate vomiting of pregnancy and outline treatment.

2. What are the causes of spontaneous abortion?
  3. What conditions justify the induction of abortion?
  4. Outline full treatment of lacerated perineum.
  5. What is hour glass contraction of the uterus and how should it be treated?
  6. What is placenta previa? Give the method of management.
  7. Give your treatment of a recent attack of specific vaginitis. Name two of its most common sequelæ.
  8. Give the symptoms and diagnosis of ectopic gestation.
  9. Define presentation and position.
  10. In a difficult labor, upon what would you base your decision as to whether Casarian section or the application of forceps would be the proper procedure?
- 

## CHEMISTRY.

1. What do we mean by the group of chemical substances known as the ethers?
2. Which is the most poisonous compound of As?
3. What is the antidote of acute poisoning by  $\text{HgCl}_2$ ?
4. Give formula, use in dentistry, and chemical process of making nitrous oxide.
5. What is the difference between a chemical and a physical change?
  - (b.) How many elements are there?
  - (c.) What is the difference between metals and non-metals?
  - (d.) Into how many groups are the metals divided?
6. Name the constituents of normal urine.
7. What are the carbo-hydrates?
8. Give test for albumen in urine.
9. Give method of detecting arsenic in stomach contents.
10. What is the difference between an elementary and a compound substance?

## PHYSIOLOGY AND HYGIENE.

1. What is the function of the anterior columns of the spinal cord?
  2. Explain the phenomena of taking cold.
  3. What is reflex action? Give some examples of it.
  4. What is the function of the bile?
  5. What nerves control the movements of the heart?
  6. What is the physiology of sweat?
  7. Give the hygiene of milk from the producer to the consumer.
  8. What do you mean by sewer gas, and what influence does it have on health?
  9. What are the sources of water supply? Which is the most desirable for domestic purposes?
  10. How are disinfecting agents classified? Give example.
- 

## PATHOLOGY AND DIAGNOSIS.

1. Describe the different forms of malignant scarlet fever.
2. Give the pathology of dysentery.
3. What are the various causes of enlargement of the liver?
4. Give the diagnosis and pathology of brain tumor.
5. Give the differential diagnosis between pleurisy and intercostal neuralgia.
6. Give pathology and diagnosis of albuminuria.
7. Give pathology and diagnosis of pernicious anæmia.
8. Give pathology and diagnosis of lobar pneumonia.
9. Give pathology and diagnosis of cancer of the stomach.
10. Give pathology and diagnosis of polyuria.



## TWENTY-FOURTH EXAMINATION.

January 14 and 15, 1908.

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MATERIA MEDICA, THERAPEUTICS AND THE PRACTICE OF  
MEDICINE.*(New Hampshire Medical Society.)*

1. Name the earliest reliable symptoms of tabes dorsalis.
  2. Give the symptoms and treatment of acute endocarditis.
  3. Give indications for the exhibition of the nitrites.
  4. Give treatment of acute otitis media, and name the pathological conditions commonly leading up to it.
  5. Name two pathological conditions in which there is extreme lowering of blood pressure, and give treatment for each.
  6. Without abbreviating, write a prescription in Latin containing two or more active drugs and give the therapy of the drugs written for.
  7. Give a clinical description of acute lobar pneumonia and outline your treatment.
  8. Give a clinical description of cerebrospinal meningitis.
  9. Give the therapeutic indications for the use of strychnine.
  10. Give the diagnosis and treatment of spasmodic croup.
- 

## MATERIA MEDICA AND THERAPEUTICS.

*(N. H. Eclectic Medical Society.)*

1. Give diagnosis, prognosis and treatment for diabetes mellitus.

2. Describe Fowler's solution and give indication for its use and dosage.
3. Name an (*a*) arterial sedative; (*b*) a nerve sedative; (*c*) a heart stimulant.
4. Give treatment for (*a*) acute muscular rheumatism; (*b*) articular rheumatism.
5. Give diagnosis and treatment for (*a*) mucous croup; (*b*) membranous croup.
6. What remedies would be indicated in dropsy?
7. What is the specific action of (*a*) amygdalus; (*b*) bryonia; (*c*) belladonna?
8. Give some of the preparations of iron and mention conditions where they are indicated.
9. In fevers what medicines would be useful yet not harmful in reducing the temperature?
10. Differentiate intercostal neuralgia from pleurisy, and give treatment.

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#### ANATOMY.

1. What muscles are included in the lumbar region?
2. Name the cranial nerves and give the distribution of the longest and shortest pair.
3. Give the complete anatomy of the ear.
4. Follow a drop of blood from the left ventricle to the finger tip and back to the heart.
5. Of what does the sympathetic nervous system consist?
6. Place and describe the occipital bone.
7. Describe the knee joint in detail.
8. Enumerate and describe the muscles of the abdomen.
9. Give the origin, course, termination, and branches of the external carotid artery.
10. Give the general arrangement of the lymphatic system.

## SURGERY.

1. What are the indications for appendectomy?
  2. Give contraindications to the employment of ether and chloroform.
  3. Give symptoms, diagnosis and treatment of intestinal obstruction.
  4. What is empyema? Give diagnosis, prognosis and treatment.
  5. What are the signs and symptoms and what is the surgical treatment of a purulent effusion into the knee joint?
  6. Describe asepsis and antisepsis. Illustrate.
  7. Describe origin, symptoms and complications of adenoids and give operative technique for removal.
  8. Differentiate between suppurating gall bladder and gall stones, and give operative technique in each.
  9. How would you treat foreign body in air passages?
  10. Give symptoms, treatment and prognosis in basilar fracture of skull.
- 

## OBSTETRICS.

1. Outline treatment for inevitable abortion.
2. Name some of the diseases of pregnancy.
3. What changes take place in the organs of the mother during normal pregnancy?
4. Describe the care of the new-born child and method of nourishment during the first two or three days there being an absence of mother's milk.
5. Give the indications for low forceps.
6. Differentiate true and false labor pains.
7. Name several conditions of the mother that unfit her to nourish the infant.

8. Describe the mechanism of a breech presentation, and the disposition of the cord during the expulsion of the child.
9. Name the disturbances and disorders incident to the menopause.
10. Outline treatment for cancer of the cervix in a gravid uterus.

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#### CHEMISTRY.

1. What is the difference between CO and CO<sub>2</sub>?
2. What is the action of KOH on the tissues? To what class of poisons does it belong?
3. What is water of crystalization? Give example.
4. What is the difference between an alloy and an amalgam?
5. Which contains the more mercury, the yellow or the red iodide of mercury? How much more?
6. What is the source of phosphorus? Name its compounds.
7. What acid is made from oil of wintergreen?
8. Give the most marked symptom of poisoning by nitrate of silver.
9. What is chloride of lime? Give preparation, formula, and use.
10. What is the difference between nitric and nitrous oxide?

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#### PHYSIOLOGY AND HYGIENE.

1. What are the fundamental properties of life?
2. What are the physiologic properties of protoplasm?
3. Give the physiologic classification of the nervous system.

4. How do the products of digestion find their way into the general circulation?
  5. Mention the secreting membranes, where situated, and what do they secrete?
  6. A test meal, what is it, describe in full; and what is the clinical value?
  7. What metallic contamination of food is most common, and its source?
  8. What is carbon monoxide; what is its influence upon health; and in what proportion is it dangerous to life?
  9. What substances are found normally in water?
  10. What are physical disinfectants? Give example.
- 

#### PATHOLOGY AND DIAGNOSIS.

1. Give the symptoms of neuritis.
2. Give the cause, symptoms and pathology of yellow fever.
3. Describe a case of parotitis and its possible complications.
4. What are the symptoms of ergotism?
5. What are the symptoms and complications of acute chorea?
6. Give the symptoms and pathology of emphysema.
7. Give the symptoms of ileus.
8. Give the symptoms and morbid anatomy of simple chronic gastralgia.
9. Describe Widal's serum test in typhoid fever.
10. Describe Koplik's spots; of what disease are they the pathognomonic sign?

## TWENTY-FIFTH EXAMINATION.

July 15 and 16, 1908.

MATERIA MEDICA, THERAPEUTICS AND THE PRACTICE OF  
MEDICINE.*(New Hampshire Medical Society.)*

1. Mention the silver salts used in medicine and give the dose of each.
2. Give the materia medica of gelseminum and its therapeutic indications.
3. Give the materia medica and therapeutic uses of ergot.
4. Differentiate chronic eczema from psoriasis.
5. What is hematemesis? Mention the most reliable remedy for its relief.
6. Give clinical description of tubercular meningitis. Is it usually primary, and at what age is it most common?
7. What is tetanus? Give incubative period of acute tetanus and differentiate from strychnine poisoning.
8. What is acute poliomyelitis anterior? Give clinical description.
9. Give etiology and treatment of hemothorax.
10. What treatment would you recommend for post diphtheritic paralysis? What is the prognosis?

## THERAPEUTICS.

*(New Hampshire Homeopathic Society.)*

1. Give seven grand characteristics of arsenious acid.
2. What is an important key-note for pokeroor?
3. What is the general action of argentum nitricum?

4. Give the general action of mandrake.
  5. Give the diarrhœa of croton tiglium.
  6. Give the grand action of rhus tox.
  7. What is the physiological action of bryonia?
  8. What are the alkaloids of ignatia?
  9. What is the general action of veratrum album?
  10. Give six characteristic symptoms of phosphorus.
- 

## THERAPEUTICS.

(*New Hampshire Eclectic Medical Society.*)

1. Describe hypodermoclysis and the conditions in which it is practised as a therapeutic means.
  2. What is understood by therapeutic incompatibility? Give an illustration.
  3. What is a chemical incompatibility? Give an illustration.
  4. Differentiate lobar from lobular pneumonia.
  5. Mention three drugs used to stimulate the heart, and give doses.
  6. Mention three drugs used to retard the action of the heart, and give doses.
  7. Write prescription for an adult suffering from acute muscular rheumatism.
  8. Describe erythema nodosum, and give treatment.
  9. Diagnose and prescribe for child suffering from cholera infantum.
  10. Prescribe for an adult suffering from insomnia.
- 

## ANATOMY.

1. Name all the muscles that have to do with respiration.
2. Locate, anatomically, the normal heart.



3. Name and give distribution of third pair of cranial nerves.
4. What are the organs of assimilation? Name them.
5. What is meant by the vasomotor nervous system?
6. Place and describe the nasal bone.
7. Describe the hip joint.
8. Describe the pectoral muscles.
9. Give origin, course and termination of the popliteal artery.
10. Describe the uterus and its appendages.

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SURGERY.

1. Differentiate between acute and chronic perforation of gastric ulcer, and give treatment of each.
2. Describe technique of supra-pubic drainage of bladder.
3. Give symptoms of adenoids and describe operation for removal.
4. Describe the effects of ether and chloroform on the respiratory and cardiac centers.
5. Differentiate between inguinal and femoral hernia, and give treatment of each.
6. Enumerate causes of vomiting which may require surgical interference.
7. Give diagnosis and treatment of iritis.
8. Name the various dislocations of the shoulder joint and give symptoms of each.
9. Give diagnosis of mastoid disease.
10. Describe briefly inflammation, cellulitis, suppuration, and gangrene.

## OBSTETRICS.

1. At what time of gestation is the placenta formed?
2. Give symptoms and diagnosis of ectopic gestation.
3. Give the common causes of sub-involution of the uterus.
4. Give treatment for specific vaginitis; name its most common sequelæ.
5. Under what circumstances would you irrigate after confinement, and with what solutions?
6. Describe the placental circulation.
7. How would you manage a case of prolapsed funis?
8. Give best method of management of shoulder presentation.
9. What is the difference between presentation and position?
10. Define metrorrhagia; what would you suspect should it occur subsequent to the menopause?

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 CHEMISTRY.

1. Define anæsthetics, sedatives, narcotics. Give an example of each.
2. Name an antidote to carbolic acid. How would you diagnose carbolic acid poisoning before death?
3. Compute the following formulæ:  

$$\text{Q H el} + \text{Ca C O}_3 = ?$$

$$\text{Zn} + \text{H}_2 \text{S O}_4 = ?$$

$$\text{Ba} + 2 \text{Hcl} = ?$$
4. What are isomeric compounds?
5. Give symptoms and treatment for chronic lead poisoning.
6. Give treatment for phosphorus poisoning.
7. Describe properties of hydrogen. How prove that it is not a supporter of combustion?

8. Give formulæ for (a) sulphuric acid; (b) nitric acid; (c) carbolic acid.
  9. What is the difference between analysis and synthesis?
  10. How is oxalic acid obtained, and what are its antidotes?
- 

#### PHYSIOLOGY AND HYGIENE.

1. Define albuminoids. Mention two, and where found.
  2. What is epithelial tissue? Give its general function.
  3. Describe visceral muscle. What is its physiologic property?
  4. What are the physiological properties of nerves?
  5. What are the forces concerned in the circulation of the blood?
  6. What are the functions of the medulla oblongata and pons?
  7. What are the best methods of food preservation?
  8. What substances are found normally in water?
  9. What are the more common methods of sewage disposal? Which will you advise for large cities?
  10. Discuss (in brief) the hygiene of occupation.
- 

#### PATHOLOGY AND DIAGNOSIS.

1. Give pathology and diagnosis of pyonephrosis.
2. Differentiate between a actinomycosis and tubercular infection of tissues of neck.
3. What symptoms during first year of life would lead you to make a diagnosis of congenital pyloric stenosis?
4. Give pathology and diagnosis of herpes zoster.
5. Give pathology and diagnosis of articular rheumatism.
6. Give pathology and diagnosis of typhoid fever.

7. Give pathology and differential diagnosis between smallpox and chicken-pox.
8. Describe the post-mortem appearance of a case of intussusception.
9. Describe a case of broncho-pneumonia.
10. Describe the symptoms of disease of the suprarenal capsule.

## REGISTERED PHYSICIANS.

The entire number of practitioners of medicine and surgery registered at this date (October 1, 1908) is one thousand and one hundred and fifty-one. A list is here given, omitting those who are known to be dead.

It should be noted that this list does not purport to be accurate on any other point than that of registration. Notification of deaths and changes of residence will enable the regent to present a more nearly accurate record.

"A" is used to designate those who were in practice prior to the passage of the law; "B," those who have passed the examination; "C," those graduates of a New Hampshire medical school whose diplomas have been endorsed; "D," admitted by reciprocity with other states under law of 1907; "E," admitted by endorsement of other state licenses issued upon examination.

B	Abbott, Albert Francis, Hom.,	Leominster, Mass.
A	Abbott, Alfred W.,	Laconia
A	Abbott, Charles Benjamin,	Suncook
A	Abbott, Clifton S.,	Laconia
B	Abbott, Edson Moses,	Rochester
B	Abbott, Florence Hale,	
A	Abbott, Walter H.,	Hillsborough Bridge
A	Adams, Chancey,	Concord
A	Adams, Charles W., Hom.,	Franklin
B	Adams, Walter Forrester, Hom.,	Waltham, Mass.
C	Albright, Clifford Brandt,	Keene
A	Aldrich, Ezra Barnes,	Manchester
B	Aldrich, Lewis Clarence,	Jefferson
A	Aldrich, Walton H.,	Marlborough

A	Alexander, Anson C., Hom.,	Penacook
A	Allen, Arthur Norman, Hom.,	Tewksbury, Mass.
A	Allen, Bradford,	Nashua
A	Allen, Clarence Jean,	Winchester, Mass.
A	Allen, Walter Algeno,	Hampstead
B	Allin, Fred Andrea,	West Stewartstown
A	Ames, Andrew Almon, Ec.	
B	Amsden, Henry Hubbard, Hom.,	Concord
A	Andrews, Ezekiel Bennett,	Ossipee
A	Angulo, Alensandro.	
A	Annable, Edwin G.,	Concord
A	Annis, Ai Stillman, Hom.,	Rochester
A	Anthoine, Isaiah Gilman,	Nashua
A	Atherten, Ella Blaylock,	Nashua
A	Atkinson, Leonard Woods, Hom.,	Fryeburg, Me.
A	Axtell, John Fremont,	Newton
A	Bachelor, Mary W.,	New Hampton
B	Bailey, George S.,	Hillsborough Bridge
C	Bakeman, Francis Albert,	Franklin
C	Baker, Benjamin Ward.	
B	Baker, Ida Belle.	
A	Baketel, Harrie S.,	Jersey City, N. J.
C	Baketel, Roy Vincent,	Methuen, Mass.
B	Baldwin, Harrison P., Hom.,	Boston, Mass.
C	Ballard, Clarence Pressey,	Gilmanton Iron Works
A	Baneroft, Charles P.,	Concord
B	Barbrick, John Fraser,	Boston, Mass.
A	Barker, Justin Starr,	Kennebunk, Me.
C	Barker, Ralph Higgins,	Chester
B	Barnes, Harry Aldrich,	Boston, Mass.
A	Barnes, Walter R.,	Orford
A	Barnett, Henry, Ec.,	Lancaster
A	Barney, J. Sarah, Hom.,	Franklin
C	Bartlett, Percy,	Hanover
A	Basch, William A.,	Ashuelot

B	Bastian, George Leon,	Manchester
B	Batchelder, Edward Carpenter,	Dover
B	Bates, John Howard,	East Rochester
C	Bates, Willard Asa,	Palmer, Mass.
B	Beardsley, Fred Nickerson,	Manchester
C	Beaton, Alexander Angus,	Franklin Falls
A	Beattie, William Johnston,	Littleton
A	Beauclerk, William Preston,	Concord
A	Beaudet, Louis Philippe, Ec.,	Newmarket
C	Beaudoin, Bennett Mortimer Roland,	New York, N. Y.
C	Beckford, Henry Shedd,	Belmont
A	Beckley, George Hallam,	Derry
C	Beckwith, Henry Witter,	Norwich, Conn.
A	Beers, Elbridge G., Ec.,	Plainfield
A	Bell, Ernest Lorne,	Plymouth
A	Bennett, Clara Hutchinson, Ec.,	Dover
B	Bennett, Hamlin P.,	Lynn, Mass.
B	Bennett, Henry Wells Newell,	Manchester
A	Bennette, George Roby,	Hampstead
A	Bernier, Edmond,	
A	Berry, Herman Irving,	Wolfeboro
A	Berry, John James,	Portsmouth
B	Berry, Nathaniel L., Jr.,	Moultonborough
A	Berube, Pierre,	East Candia
C	Bessey, Earl Emerson,	Hathorne, Mass.
B	Biebarback, Walter Daniels,	Worcester, Mass.
B	Biron, Wilford Louis,	Manchester
C	Bisbee, Walter G.,	Philadelphia, Pa.
A	Bishop, Channing, Hom.,	Bristol
B	Bishop, Leslie Carr,	Marbleton, Quebec
A	Bixby, Ernest P.,	Francestown
C	Black, James S.,	Nashua
A	Blaisdell, Frank,	Goffstown
A	Blaisdell, George Clark,	Contoocook
A	Blanchard, Roseoe G.,	Dover
A	Blanchard, Walter Irving,	Boston, Mass.



A	Blazo, Charles.	Rochester
B	Blodgett, Merlin Freeborn,	Penacook
A	Bloom, David N.	
A	Bogardus, Frank A.,	Canaan
A	Bolster, Augustus S.	
A	Boutwell, Henry Thatcher,	Manchester
A	Boutwell, Henry Winslow.	Manchester
A	Bowker, Charles Harvey,	Washington, D. C.
B	Bowker, John William,	Hanover
A	Boynton, Harry Hollister,	Lisbon
A	Boynton, Oren Hart,	Lisbon
A	Brien, Augustus A. E.,	Manchester
A	Brigham, Frank E.,	Salmon Falls
A	Brockway, Daniel G.,	Lebanon
A	Bronson, Austin S.,	New Hampton
A	Brooks, Nathaniel G.,	Charlestown
B	Brooks, Robert H.,	Claremont
B	Brown, Elmer F.,	Groveton
B	Brown, Harry Alburtus,	Boston, Mass.
B	Brown, Hurbert Leslie,	Hinsdale
A	Brown, James Scribner,	Manchester
B	Brown, John Bean, Hom.,	Fergus Falls, Minn.
B	Brown, Lester Rupert, Ec.,	Winchester
B	Brownrigg, Albert Edward,	Nashua
A	Bruce, Thomas Kitson, Ec.	
C	Bryant, John Edmund.	
A	Bryar, Fred Elmer,	North Sandwich
C	Buckley, James Joseph,	Milton
C	Bugbee, Locke Harwood,	North Pomfret, Vt.
B	Bugbee, Marion L.,	Concord
A	Bullock, Lillian Gertrude, Ec.,	Manchester
A	Burleigh, Robert F.,	Braintree, Mass.
A	Burnham, Charles Henry,	Jefferson
C	Burnham, Elisha Bennett.	
A	Burnham, Hosea B.,	Manchester
A	Burnham, John Loring.	

A	Burns, Robert,	Boston, Mass.
C	Burr, Clarence Harvey,	Montpelier, Vt.
B	Burt, Edward Daniel,	North Woodstock
A	Buswell, Albert Currier,	Epping
A	Butler, John Freeman,	Spofford
B	Butterfield, Clarence E.,	Suncook
A	Buzzell, Charles P.,	Conway
A	Byrnes, Ambrose Guy,	
A	Cain, J. Leavitt,	Newport
B	Cain, Willie George,	Epping
B	Caissac, Louis P.	
A	Call, Henry Clay,	
A	Calley, George H.,	Bristol
A	Campbell, George Abbott, Hom.,	Manchester
B	Campbell, Franklin E.,	Manchester
A	Carlton, Elmer Howard,	Hanover
B	Caron, Damase,	Franklin Falls
A	Carpenter, Harry B.,	Lancaster
A	Carpenter, Irving Lloyd,	Manchester
C	Carr, Burt Wilbur,	Pittsfield
B	Carty, John Dawson,	Rochester
A	Carvelle, Henry DeWolfe,	Manchester
B	Casey, Edward L.,	North Woodstock
B	Cate, George Riley,	
B	Caverly, Fred S.,	Passaic, N. J.
A	Champagne, Joseph C. A., Hom.	
A	Chandler, Frederick,	Amherst
A	Charest, Joseph Amidie,	Nashua
A	Charest, Joseph Charles Benonie,	Greenville
B	Chase, Edwin L.	
B	Chase, Daniel Robert,	
A	Chase, Ezra Clark,	Orford
B	Chedel, Charles B.,	Hanover
A	Cheever, Benjamin,	Portsmouth
A	Cheever, Nathaniel F.,	Greenfield
A	Cheney, Harry Applebee,	Campton Village

A	Cheney, Jonathan M.,	Ashland
B	Chesley, Alice Maud Mary,	Exeter
C	Chesley, Harry O.,	Dover
A	Chesnut, Arthur Allen, Hom.,	Antrim
A	Child, William,	Highland Lake, Va.
B	Childs, Alfred Henry,	Dublin
A	Chirurg, Charles,	Manchester
A	Christie, Morris, Hom.,	Antrim
B	Christophe, Herman,	Manchester
B	Cilley, Arthur Hutchins,	New York City
A	Claggett, Fred Porter,	Newport
A	Clark, Edgar A.,	Concord
A	Clark, Henry Frederick, Ec.,	New York, N. Y.
A	Clark, Levi,	Pittsfield
B	Clark, William Edward, Jr.,	Lempster
B	Clarke, George Haven,	Concord
A	Clough, George Henry,	Wolfeboro
B	Clow, Fred Ellsworth,	Wolfeboro
B	Cobb, Gardner Nathan,	White River Junction, Vt.
A	Cobb, Joseph J.,	Berlin
B	Coburn, Clarence O.,	Manchester
B	Cody, Joseph John,	Boston, Mass.
B	Cogan, Richard Merwin,	Providence, R. I.
A	Cogswell, John R.,	Warner
B	Cogswell, Lloyd H.,	Warner
A	Cogswell, Samuel Johnson,	Derry
A	Colby, Frank Edgar,	Bow
A	Colby, Myron Morton, Hom.	
A	Coleord, Daniel Webster,	Seabrook
A	Cole, Cheney Isaac,	Henniker
B	Colgate, Charles Henry, Jr., Hom.,	Rockland, Mass.
A	Collity, James Michael, Ec.,	Manchester
B	Congdon, Charles Everett,	Nashua
A	Conn, Granville P.,	Concord
B	Connell, Karl Albert,	New York

C	Connor, Michael Edward,	Amesbury, Mass.
C	Cook, Charles Henry,	Concord
A	Cook, Edwin A.,	Colebrook
A	Cook, George,	Concord
A	Cooke, T. Bates,	Laconia
C	Coolidge, John Wesley,	Bristol
B	Cooper, Edward,	Worcester, Mass.
A	Copp, George Wilbur, Hom.,	Melvin Village
C	Corbett, John Baptiste,	Providence, R. I.
B	Corliss, Oscar Luzerne,	Walpole
B	Corning, Peter Winslow Franklin,	Haverhill, Mass.
B	Corwin, Arthur Sherwood,	New York
A	Cotton, Curtis B.,	Wolfeboro
A	Coutu, Joseph Edward,	Claremont
C	Cowern, Ernest William,	North St. Paul, Minn.
A	Craddock, Ebenezer Benjamin, Ec.,	Concord
B	Craig, Willis Parker,	Walpole
A	Cramm, William Edward,	
C	Crittendon, Samuel Wright,	Newton, Mass.
B	Crosby, Walter Theodore,	Manchester
C	Crosby, William Pierce,	Hanover
A	Crossman, Edgar O.,	Lisbon
B	Crowell, George Marcus,	Canaan
A	Cummings, Fred Eben,	Pittsfield
A	Curley, Clarence P.,	Greenfield, Mass.
A	Currier, David M.,	Newport
A	Currier, Edward H.,	Manchester
A	Currier, George W.,	Nashua
B	Curtis, Harlan Fuller,	
B	Curtiss, Charles Lester,	Manchester
B	Cushman, Earl Percy,	Claremont
A	Cutler, Charles Henry,	Peterborough
A	Cutler, George I.,	West Swanzey
B	Dame, Fred Russell,	
A	Dansereau, Pierre E.,	Nashua

A	Davenport, George E..	Lisbon
A	Davis, George Moses.	Manchester
A	Davis, Gilman.	Portland, Me.
A	Davis, Henry S., Hom..	Grafton, Mass.
A	Davis, Samuel Wilbert.	Sanbornville
A	Day, Arthur Kehew.	Concord
A	Day, Herbert Christopher.	Exeter
A	Day, James A..	Waltham, Mass.
A	Dean, Elmer E..	Lebanon
A	Dearborn, Darius Stearns.	Milford
B	Dearborn, Edmund Gerrish.	Keene
A	Dearborn, Frank A.,	Nashua
B	Dearborn, Henry Follansbee.	Malden, Mass.
B	Dearborn, Henry Hale.	Cambridge, Mass.
B	Dearborn, Jesse Judson.	Milford
B	Dearborn, Luther Gould, Jr..	Portland, Me.
B	Dearborn, Sam Starrett.	Nashua
B	Dearborn, Selwyn K..	Woodsville
C	De Gross, John H..	Manchester
B	Delaney, Edward James.	Concord
B	DeMoulied, Walter.	Hemmingford, Que.
B	Dennison, Raymond Chase.	Berlin
A	Dessaint, Fred.	Groveton
B	Dillon, Richard Hastings.	Manchester
A	Dimick, George E..	Jefferson
A	Dinsmoor, Frank M..	Keene
A	Dinsmoor, Silas M..	Keene
B	Dinsmore, Herman Hunter,	Enfield
B	Dixon, James Henry,	Portsmouth
A	Dodge, Charles E., Hom..	Syracuse, N. Y.
A	Dodge, Clarence M.,	Manchester
B	Dodge, George Francis,	Plymouth
A	Dodge, Henry,	Webster
B	Dolloff, Albert Simeon,	New Hampton
B	Dolloff, Charles Hall,	Concord

A	Dougherty, Thomas James,	Somersworth
A	Douglas, Orlando B.,	Concord
A	Dowd, Arthur V.,	Bristol
A	Dowlin, Oliver,	Wolfeboro
A	Dowlin, Winfred Mason,	Claremont
B	Downing, Arthur T.,	Littleton
A	Drake, Charles B.,	West Lebanon
B	Drake, Dean Spencer,	West Lebanon
A	Drake, Ervin Thayer,	Franklin
B	Drake, Percy Greenough,	Greenland
A	Drew, John A.,	Rumney
A	Duchene, Henry Francis J.	
A	Dunbar, Eugene B.,	Manchester
B	Duncan, Charles,	Concord
A	Dunham, William Russell,	Keene
B	Durgin, Edward Chase,	East Andover
A	Durkee, Freeman Austin, Ec.,	Belmont
A	Duval, Ernest,	Rochester
B	Dyer, William Henry,	Providence, R. I.
A	Eames, Frederick Henry,	Somerville, Mass.
A	Eames, William Morse,	Manchester
A	Eastman, Charles Albert,	Old Orchard, Me.
B	Eastman, Eugene Bruce,	Portsmouth
A	Eastman, Isaac N.	
A	Eastman, Oliver Davis,	Woodsville
B	Eastman, Oliver Newell,	Woodsville
B	Easton, Frank Birch,	Laconia
A	Eaton, Frank,	East Weare
B	Edes, Robert Thaxter,	Jamaica Plain, Mass.
C	Elliott, William Thomas,	
B	Ellison, Daniel J.,	Cambridge, Mass.
A	Ellison, George Washington,	Farmington
B	Emerson, George Short,	Fitzwilliam
A	Erskine, James B.,	Tilton
A	Estes, Florella,	

C	Evans, Frank W..	Coos
B	Evans, John W..	Ottawa, Ont.
A	Fairbanks, Charles Albert,	Dover
B	Farnum, Mary Louise Rolfe,	Penacook
B	Farr, Irvin H.,	Hanover
A	Faulkner, Herbert Kimball,	Keene
B	Federman, Phil Herbert,	New York City
A	Fellows, George Roberts,	Seabrook
A	Ferguson, Arthur Clifford,	Berwick, Me.
A	Ferguson, John,	Manchester
B	Ferguson, Samuel Thomas,	North Weare
B	Fernald, Arthur May,	Sutton
B	Fernald, Fred,	Nottingham
B	Ferrin, William Warren,	
A	Finerty, Joseph William, Hom.,	Milford
A	Fisher, Edwin C.,	Sunapee
A	Fisher, Franklin Pierce,	Enfield Center
A	Fisher, Thomas E., Hom.,	Francestown
B	Fiske, George Varnum,	Northwood Ridge
B	Fitch, Emery Moore,	Claremont
A	Flagg, George W., Hom.,	Keene
A	Flanders, Charles F.,	Manchester
A	Flanders, Louis W.,	Dover
A	Flanders, Marietta Ellis Monroe,	Hopkinton
B	Foley, Joseph Francis,	Wilton
C	Folsom, Charles Albert,	Manchester
A	Fontaine, Henri Theophile,	Pembroke
A	Ford, Inez H.,	Dover
B	Foss, George Herbert,	Portsmouth
A	Foster, Avery Moulton,	Candia
B	Foster, George S.,	Manchester
B	Foster, Louis Everett,	
B	Fournier, Arthur,	
B	Fowler, Fred Abram,	Hill
A	Fowler, Isaac Newton,	Lebanon



B	Fraser, Samuel,	Wentworth
A	Frechette, George.	Manchester
A	French, Albion H.,	Pittsfield
B	French, Edward.	Medfield, Mass.
A	French, L. Melville,	Manchester
A	Frink, Lewis J.	
A	Fritz, Emdon,	Manchester
A	Frost, Gilman DuBois,	Hanover
A	Fugere, Edouard Napoleon,	Manchester
B	Fuller, George Frederick LeRoy,	Sweetsburg, P. Q.
B	Gaffario, Pippo Joseph,	Warner
A	Gallinger, Jacob H., Hom.,	Concord
C	Gallinger, Ralph Ernest,	Concord
A	Gardner, Guy Hubbard,	Revere, Mass.
A	Garland, Wm. Russell,	Plymouth
C	George, Arthur Phillips,	Haverhill, Mass.
A	George, Charles F.,	Goffstown
A	Gerald, Francis Leverett, Ec.,	Warren
B	Getchell, Stillman P.,	Wolfeboro
A	Gibson, Charles Reed,	Woodsville
B	Gibson, John Mitchell.	
A	Gifford, John Pearl,	Randolph, Vt.
A	Gile, John Martin,	Hanover
A	Gilman, Charles Sleeper,	Boston, Mass.
A	Gilman, Louis Lincoln,	Rochester
A	Girouard, Simion Joseph,	Greenville
A	Gleason, John Hiram,	Manchester
A	Golden, Robert Henry.	
A	Goodell, John,	Hillsborough
A	Goodhue, David Putney,	West Springfield
B	Goodrich, Charles Howard,	Brooklyn, N. Y.
C	Goodwin, Harold Carl.	Albany, N. Y.
A	Gould, Albert Nason,	Effingham Center
A	Gould, Charles Reade,	Tilton
A	Gould, Chester Harlow, Hom.,	Braintree, Mass.
A	Gould, Herbert D., Hom.,	New Boston

A	Gove, Anna M.,	Whitefield
A	Gove, George Sullivan,	Whitefield
A	Grady, John William,	
A	Grady, Thomas Ambrose,	
A	Grafton, Frank Willard,	Concord
B	Graham, George Sellers,	Hanover
A	Grant, Albert Ernest,	Durham
A	Grant, Daniel,	
A	Grant, Lindsey E.,	Somersworth
A	Grappner, Max C.	
A	Gravel, Henri, Ec.,	Derry
A	Graves, Eli E.,	Boscawen
B	Graves, Robert John,	Concord
A	Greeley, Guy Hastings,	Merrimack
A	Greeley, James Thornton,	Nashua
A	Greeley, Philip Hartshorn,	Farmington
A	Green, Samuel H.,	Newmarket
A	Greene, Frank Alonzo, Ec.	
A	Greene, Jared Alonzo, Ec.,	Laconia
B	Griffin, Nathan LeRoy,	New London
B	Grimes, Jesse Rideout,	
A	Grimes, Warren Parker,	Hillsborough
A	Gross, Charles William,	Milton Mills
C	Grow, Eugene Julius, Surgeon, U. S. Navy,	
A	Guerin, Moise,	Manchester
A	Guertin, Auguste,	Nashua
A	Guggenheim, Max Samuel,	
A	Guillet, Noel Eusebe,	Manchester
A	Guptill, George Herbert,	Raymond
A	Hall, Charles E.,	Greenville
A	Ham, John Randolph,	Malabar, Fla.
A	Hamblett, Lorenzo D., Ec.,	Somersworth
A	Hammond, Charles Bartlett,	Nashua
B	Hanaford, Howard A.,	Newport
B	Hanlon, Orville Leon,	Ridgdonville, Me.

B	Hannaford, Charles William,	Portsmouth
A	Hanson, Caleb W.,	Northwood Ridge
B	Hanson, William Clinton,	Cambridge, Mass.
A	Harlan, James A.,	Manchester
A	Harlow, Franklin Edwin,	Windsor, Vt.
B	Harmon, Charles Henry,	York, Me.
A	Harriman, A. H.,	Laconia
B	Harrington, Charles Woodbury,	Peterborough
A	Hart, Malcolm A. H.,	Milton
A	Harvey, Albion King Parris, Hom.,	Washington, D. C.
A	Harvey, James Barton,	
A	Harwood, Blake A. T.,	Exeter
A	Harwood, Jane L., Ec.,	Nashua
A	Haskell, Pearl Jenney,	Concord
A	Hatch, George B.,	Newbury, Vt.
A	Hatch, George Windsor,	Wilton
C	Hatch, Lawrence Brown,	Rindge
A	Hawkins, Frederick Lewis,	Meredith
A	Hawley, George H.,	Barnstead Center
B	Hayes, Blanche Adelyn,	Cambridge, Mass.
A	Hayes, Frederick Legro,	Brookline, Mass.
A	Hayes, John Alfred,	Somersworth
A	Hayford, Herbert Scott, Hom.,	Quincy, Mass.
A	Hazard, George Stevens,	Hollis
A	Hazelton, George William,	Haverhill
A	Hazleton, Robert Harvey, Hom.,	Lebanon
C	Healey, Thomas Raymond,	Newburyport, Mass.
B	Hebb, Angus Gordon,	
A	Heffinger, Arthur Cowton,	Portsmouth
B	Heffner, William J.,	Gilbertville, Mass.
B	Herrick, Timothy G.,	Denver, Col.
A	Higgins, Clifford E.,	Wilton
A	Higgins, George,	
A	Higgins, John Henry,	
B	Higgins, Martin Andrew,	Somersworth

B	Hight, Clarence Eugene,	Milan
A	Hildreth, Henry A.,	Bethlehem
A	Hildreth, Lewis George,	Marlborough
A	Hill, Almon Ward,	Concord
A	Hill, Edmund E.,	Suncook
C	Hill, Ernest Linwood,	Millis, Mass.
A	Hill, Gardner C.,	Keene
A	Hill, Roscoe,	Epsom
A	Hill, Thomas C.,	Boston, Mass.
A	Hill, William D.	
A	Hillard, William Avery,	Stonington, Conn.
A	Hills, Frederick L.,	Rutland, Mass.
A	Hinds, William Henry Weed, Jr., Hom.,	Milford
C	Hoag, Albert Buffum,	Center Sandwich
A	Hodgdon, Edwin Pickering,	Lakeport
B	Hodsdon, Benjamin Frank,	Chicago, Ill.
A	Hodsdon, Ervin Wilbur,	Centerville
C	Hoitt, George Barnard,	Manchester
A	Holbrook, Henry Carroll,	Penacook
A	Holecombe, Charles Henry,	Brookline
C	Hopkins, Arthur W.,	West Swanzey
A	Horne, B. Frank,	Conway
B	Hoskins, Neal Luther,	Sugar Hill
A	Houghton, Edward F.,	Tilton
B	Houle, Anselme Eprem.	
B	Hoyt, Park Rowe,	Lakeport
B	Hubbard, Halbert Charles, Hom.,	Norwood, Mass.
B	Huckins, John Calvin,	Ashland
C	Huckins, Theron Howard,	Tilton
A	Humiston, Franklin G.,	East Jaffrey
B	Hunt, Daniel Lawrence,	Boston, Mass.
A	Hunt, Mary Olive Ann,	Manchester
A	Huntress, Eugene S.	
C	Hurd, Benjamin Porter,	Merrimack
B	Huse, Ernest Leslie,	Meriden

B	Hutchins, Guy Howard,	Auburn, Me.
A	Hutchinson, Herbert S.,	Milford
A	Huyek, Clifford John, Hom.	
A	Hyde, Edward,	Pelham
A	Hyland, Jesse Burdette,	Keene
C	Ide, Philip Sheridan,	Newport, Vt.
B	Ingham, Oswald Grey,	Bellows Falls, Vt.
A	Jackson, Henry Chester,	Woodstock, Vt.
A	James, Herbert Wilkins, Hom.,	Texas
B	Jameson, James Walker,	Antrim
A	Jarvis, Leonard,	Claremont
A	Jewell, Henry Hiram, Hom.,	Nashua
A	Johnson, Albion Wesley,	Kittery, Me.
B	Johnson, Edward West,	New York City
A	Johnson, Henry Warren,	
B	Johnson, Herbert William,	Spokane, Wash.
A	Johnson, Hiram Leonard,	Franconia
C	Johnston, Charles Edward,	Kittery Point, Me.
A	Jones, Charles Dana,	Milton
A	Jones, Edwin E.,	Colebrook
B	Jones, Ezra Albert,	East Hampton, Conn.
A	Jones, Fred P.,	Goshen
A	Jones, Frederic William,	New Ipswich
A	Jones, Seth Warner,	Franklin Falls
A	Joslin, Perry Edwin,	
B	Joyce, Charles Pitt Fid,	Kingston
A	Junkins, William O.,	Portsmouth
A	Kean, Michael Edward,	Manchester
A	Keay, Forrest Lincoln,	East Rochester
B	Keay, Harry Chester,	Worcester, Mass.
B	Keene, Linwood Melrose,	Strafford Center
B	Kelso, Walter Lamson,	Hillsborough Bridge
A	Kempton, Amanda Harriet, Hom.,	Newport
A	Kenney, John Erle,	Keene
B	Kenniston, William Beaman,	Exeter

A	Kent, Maude, Hom.,	Boston, Mass.
B	Ketchum, Henry Barstow,	Woodstock, Vt.
A	Kimball, George Morrill,	Concord
C	Kingsford, Howard Nelson,	Hanover
A	Kittredge, Frank Everett,	Nashua
A	Knapp, Lee Victor,	Danbury
A	Knight, Greenwood H., Hom.,	Laconia
B	Knowlton, John Greenleaf Whittier,	Exeter
A	Labrecque, Joseph Jerome Alphonse.	
B	Lacasse, Leon Joseph,	Manchester
B	Lachaine, Edmond,	Hinsdale
A	Ladd, Elmer E.,	West Rumney
C	Ladd, Samuel Tilden,	Portsmouth
B	Lafontaine, Gustave,	Manchester
B	La France, Albert Joseph,	Laconia
A	Lagacé, Joseph Alfred,	Nashua
A	Lajoie, Mederic Thomas Gerin,	Paris, France
A	Lake, Elmer Ellsworth,	Hampstead
A	Lamb, Frank Wilson,	Portland
A	Lamb, Zenas Freeman,	Enfield
A	Lamson, Charles Allen,	Elkins
B	Lance, Arthur Joseph,	Portsmouth
C	Landman, Elbert Alonzo,	Plaistow
A	Lanouette, Joseph Edouard Adolphe,	Manchester
A	Larochelle, Joseph Eugene,	Manchester
B	Larrabee, Ralph Clinton,	Boston, Mass.
A	Lathrop, Moses Craft,	Dover
A	Lauroin, Adelard,	Holyoke, Mass.
A	Lavalée, Arsene,	Berlin
A	Lavallee, Arthur Martial,	Suncook
B	Lavoie, Zenou Annable,	Manchester
B	Lawrence, Arthur Abbott,	Milton, Mass.
B	Lawrence, William E.,	North Haverhill
B	Leach, Homer Z.	
C	Leathers, Enoch,	Hodgdon, Me.

A	Leavitt, James Mellen,	Effingham
A	Ledue, Napoleon,	Somersworth
A	Leet, George E.,	Concord
A	Leet, James Andrew,	Enfield
B	Leith, Harry Weston,	Haverhill
A	Leith, William H.,	Lancaster
A	Lelaidier, Joseph Emile.	
A	Lemaitre, Joseph Edmond,	Manchester
A	Lemay, Joseph Daniel,	Manchester
B	Lemon, Angeline Mildred,	Manchester
B	Lenahan, John Patrick.	
A	Letourneau, Joseph N.,	Laconia
B	Libbey, Charles Emerson, Hom.,	Danville, Vt.
A	Libbey, Erving Asa.	Rangeley, Me.
B	Libby, Mildred Augusta,	Baldwinsville, Mass.
A	Lightle, William E.,	Berwick, Me.
B	Lindley, Charles L.	
B	Liston, Arthur Carliss,	Alstead
C	Little, Charles S.,	Laconia
A	Littlefield, Anna Maria,	New London
B	Littlewood, Thomas,	Concord
A	Lobdell, Alban Judson, Hom.,	Winchester
B	Locke, Anna Williard,	New York
B	Locke, Eva M.,	Nashua
C	Locke, George Scott, Jr.,	Fort Davis, Tex.
C	Lord, Charles Edward Dimmock,	Biddeford, Me.
A	Lord, Lester Winslow,	West Ossipee
A	Lougee, Arthur Jewett,	New York
A	Lougee, George Woodworth,	Freedom
B	Lougee, William Wheeler,	Malden, Mass.
B	Loughran, Elbert Du Bois.	
A	Lovejoy, Frank Howard,	Milford
A	Loveland, Israel Albert,	Gilsum
A	Lovering, Frank Samuel,	Moultonborough
A	Lovering, Oscar Philander,	Lynn, Mass.



B	Lowe, Ernest Whittier,	Fremont
A	Luce, Thomas W.,	Portsmouth
A	Lufkin, Charles Mathewson, Hom.,	Alstead
A	Lull, Mary Augusta, Hom.,	Milford
A	Lundeville, Efyveray Paul,	St. Albans, Vt.
B	Lussier, Jules Grenon,	Canada
A	Lyons, William H. A.,	Manchester
B	Macauley, Henry A. DeB.,	New York
C	McBride, John,	Barnard, Vt.
B	McClintock, Thomas Henry, Hom.	
A	MacDonald, Joseph William Dugald,	Manchester
B	McDonald, William Forbes,	
A	McGahan, Charles Fourgead,	Bethlehem
B	McGee, Edward R. B.,	Berlin
A	McGregor, George W.,	Littleton
B	McIntire, Herbert Bruce,	Cambridge, Mass.
B	McLachlan, Donald Cattanaeh,	Greenland
A	McLaughlin, Frank W.,	West Stewartstown
B	McLaughlin, Patrick James,	Mont Vernon
A	McMurphy, Nelson William,	Gilmanton
A	Mack, William B.,	Hampton
B	Macdonald, John B.,	Concord
C	Mackenzie, Nicholas Y. B.,	Salisbury
B	Macleay, Alfred Alexander,	Manchester
B	Makechine, Arthur North,	West Somerville, Mass.
A	Manchester, Frank Constant,	Grafton
B	Mangurian, Armen Steven,	Manchester
B	Manix, Edward Tuck,	Lynn, Mass.
A	Marble, Henry,	Gorham
A	Marelay, Walter J., Hom.	
B	Marcou, Louis Benjamin,	Berlin
A	Marden, Albert Lewis,	Claremont
A	Marden, Albion Sullivan,	Newport
A	Marsh, Franklin F.	
C	Marshall, Augustus T.,	Boston, Mass.
B	Marston, Albert Jeremiah,	Plymouth

A	Martin, Wilbur G.,	Madison
A	Mason, Robert,	Exeter
A	Mason, Frank Lemuel.	
A	Massicotte, Louis Charles Philippe, Ec.,	Keene
B	Mathes, Roy Wentworth,	Durham
A	Matthews, Walter Colfax,	Butte, Mont.
A	Maynard, Oswald,	Nashua
A	Megrath, William Augustus.	Loudon
A	Merrill, John F.,	Warner
A	Merrill, Sidney Aaron,	Belmont
C	Merrill, Walter Emery.	
C	Meserve, John Shackford,	Norwood, Ohio
B	Miller, Elmer Manton,	Woodsville
B	Milliken, Clarence W.,	Manchester
B	Milliken, Walter S.	
A	Mitchell, Abram W.,	Epping
B	Mitchell, Ethel Susanna,	Concord
A	Mitchell, Ezra,	Lancaster
A	Mitchell, William H.,	Loudon
A	Monge, Joseph.	
B	Moody, Harry Alton,	Saubornville
A	Moore, Joseph Clifford, Hom.,	Lakeport
A	Moran, Benjamin George,	Nashua
A	Morey, Gustavus Bartlett,	Manchester
D	Morgan, Field Chilson,	Claremont
A	Morgan, George Prentiss,	Dover
A	Morrill, Leonard B.,	Center Harbor
B	Morrill, Sibley Gage,	Concord
A	Morris, John A.	
A	Morrison, G. H., Hom.,	Whitefield
A	Morse, Charles A.,	Newmarket
A	Morse, Harry Martin, Hom.,	Peterborough
B	Morse, John Hinckley.	
A	Morse, Martin V. B., Hom.,	Manchester
B	Mousley, Bayard Taylor,	Aeworth

A	Muchmore, Alonzo Downing, Ec.,	Plymouth
A	Mudgett, John Herbert.	
B	Muller, Carl A.,	Manchester
B	Mulvarity, Albert Francis,	Nashua
A	Munsey, George Franklin,	Suncook
B	Murray, John Thomas,	Manchester
B	Musson, William Robinson, Hom.,	Antrim
A	Mygatt, Harry Edwin,	Nashua
A	Naylor, Thomas, Ec.	
A	Neal, John Herbert,	Portsmouth
C	Nelson, David,	Portland, Ore.
A	Newcomb, Charles.	
A	Newcombe, Vesley Marvin,	Somersworth
B	Newell, Charles Edward,	Bedford
B	Newell, Harry Ward,	West Derry
A	Newton, LeRoy Allen,	Greenfield, Mass.
B	Nobles, William Calvin Ellicott, Hom.,	Littleton
C	Northrop, Clarence Clark,	Manchester
A	Noyes, Edmund Herbert,	Plaistow
A	Noyes, Harold V.,	Berwick, Me.
E	Noyes, Ward Raymond, Hom.,	Brattleboro, Vt.
B	Noyes, Wilbur Fisk, Hom.,	Lowell, Mass.
B	Noyes, William Nelson.	
B	Nute, Albert J.,	Boston, Mass.
A	Nute, William Herbert,	Exeter
A	Nutter, Charles F.,	Nashua
A	Nutter, George W.,	Salmon Falls
A	Nutting, Mary A.,	Meredith
A	Nutting, Newell Curtis,	Meredith
A	Nutting, Will Wallace, Hom.,	Weirs
A	Nutting, William, Ec.,	East Concord
A	Ober, Charles F.,	Manchester
A	O'Brien, Emile A. Young, Hom.,	Lisbon
A	O'Brion, Charles C.,	Groveton
B	O'Brion, Dennis Joseph,	Portland, Me.

A	O'Carroll, Martin.	
B	O'Connor, John C.,	Bradford, Mass.
A	Odell, Joseph Warren,	Greenland
A	O'Doherty, John D.,	Dover
A	Oliver, Robert Freeman,	Alstead
B	Osterhout, John Jacob,	Marlow
A	Otis, Edward Osgood,	Boston, Mass.
A	Packard, George Henry.	
A	Page, Benjamin F.,	Littleton
B	Page, George Thornton,	Cambridge, Mass.
A	Page, John Marshall,	Littleton
A	Palmer, Clarence Alanson.	
A	Palmer, Haven,	Plymouth
B	Parker, David W.,	Manchester
A	Parker, George Henry,	Wells River, Vt.
A	Parker, Henry Rust.	Dover
A	Parker, John C.,	Providence, R. I.
A	Parker, John S.,	Lebanon, Me.
A	Parsons, John W.,	Portsmouth
A	Parsons, William Moody,	Manchester
A	Pattee, John Ralph, Ec.,	Dover
A	Pattee, William H.,	Manchester
A	Patterson, Charles Frederick,	Rye
B	Pearl, Frederick Warren,	Boston, Mass.
A	Pease, Byron Douglass,	Greenville
A	Peaslee, Benjamin D., Hom.,	Hillsborough Bridge
B	Pender, George Edward,	Portsmouth
A	Pepin, Joseph Raoul,	Suncook
B	Perkins, Anne Elizabeth, Hom.	
B	Perkins, Everett Clifton,	Farmington
A	Perkins, Frank B.,	West Derry
A	Perkins, Frederick,	Manchester
B	Perreault, Joseph N.,	Manchester
A	Perry, William G.,	Exeter
A	Petit, A. Wilfred,	Nashua

A	Pettingill, James Buchanan,	Amherst
B	Pherson, Frank J.,	Manchester
B	Phillips, William Converse, Hom.,	Springfield, Vt.
A	Phipps, Albert G.,	Gorham
A	Pierce, George W.,	Winchester
A	Pike, Ezra Barker,	Brentwood
A	Pike, Forrest Wiley,	Portsmouth
A	Pillsbury, William Emerson,	Milton Mills
A	Pitman, Arthur John,	Candia
C	Platts, Harry S.,	Troy
A	Porter, George, Hom.,	Manchester
B	Pratt, David Damon,	
C	Pratt, Harry Sumner,	Bethlehem
A	Pratte, Arthur A.,	Keene
A	Price, Walter Herbert,	
B	Proctor, John Donald,	Keene
C	Proctor, John Harvey,	
A	Prouty, Ira Joslin,	Keene
C	Provost, Azarie Moise Joseph,	Berlin
B	Pulsifer, Tappan Chase,	Berlin
A	Quackenbos, John Duncan,	New London
A	Quimby, John Grant,	Lakeport
C	Quinn, Charles Henry,	West Concord
A	Reed, Elizabeth Boss,	
B	Reed, William Edward,	Nashua
A	Remick, Edwin,	Tamworth
A	Reynolds, Thomas O.,	Kingston
B	Ricardo, James N.,	
B	Rice, Carrie Elizabeth, Hom.,	Wilton
A	Richard, Joseph Henry,	Dover
C	Richards, Karl Taylor,	Maynard, Mass.
A	Richards, Louis Joseph, Ec.	
A	Richards, Paschal B., Ec.,	Bradford
B	Richardson, Bert Leon,	Bartlett
A	Richardson, William,	Londonderry

A	Richmond, Allen P.,	Dover
B	Ricker, William Gray,	Montreal, P. Q.
B	Ridlon, Joseph R.,	Whitefield
B	Robb, William Matthews,	Boston, Mass.
A	Robbins, Elwin DeWitt.	Nashua
C	Robert, Kennedy F.,	Owego, N. Y.
A	Roberts, James Stanton.	
A	Roberts, Samuel Woodbury.	Wakefield
B	Robertson, Charles W.,	South Coventry, Conn.
B	Robertson, Frederick M.,	Bristol
A	Robinson, Frank Lawrence.	
A	Robinson, Herbert Winslow.	West Medford, Mass.
A	Robinson, J. Franklin,	Manchester
B	Robinson, Wallace Wilson.	Portland, Me.
A	Robinson, William Perry.	Ayers Village, Mass.
A	Roby, George F., Hom.	
A	Rodier, Charles Seraphin,	Somersworth
B	Rogers, Charles Cummings.	Farmington
B	Rogers, Frank Norwood.	Manchester
A	Rogers, Tristram, Hom.,	Plymouth
B	Rondinella, Annina C.,	Whitefield
B	Ross, William Edson.	
A	Rounsevel, Charles Sedgwick, Hom.,	Nashua
C	Rowe, Arthur James.	Penacook
A	Rowe, Frank Herbert,	Manchester
C	Rowe, Walter Cilley.	Andover
A	Roy, Joseph Edmond Egide.	Greenville
A	Russell, Ai Stephen, Ec.,	Rumney
A	Russell, Fred Cutler.	Newbury, Vt.
C	Russell, Walter Burton.	Springfield, Mass.
A	Russell, William Bartlett,	Bennington
A	Saltmarsh, G. H.,	Lakeport
C	Sanborn, Byron.	
B	Sanborn, George Henry.	Shawnee, Okla.
A	Sanborn, George Hoitt,	Henniker

B	Sanders, Henry Clay.	Claremont
B	Sanders, Loren Addison.	Concord
B	Sanders, Orren B.,	Boston, Mass.
A	Sanders, Walter Russell, Ec.,	Derry
C	Sargent, Elmer U.,	Penacook
A	Sargent, Frank H.,	Pittsfield
B	Sargent, Oscar F. L., Hom.	
A	Sasseville, Nicholas,	Manchester
B	Sawyer, Elihu B.,	Roslindale, Mass.
A	Sawyer, Wesley,	Lowell, Mass.
B	Sayward, William H., Jr.,	Dorchester, Mass.
C	Seannell, Edward John,	Lebanon
B	Schallenbach, Ernest B.,	Boston, Mass.
A	Scott, Nathaniel Harvey,	Wolfeboro
B	Sewall, Millard Freeman,	York, Me.
A	Shapleigh, Edward E.,	Kittery, Me.
A	Shattuck, George Wesley,	Lisbon
B	Shaw, William Hubbard, Hom.,	Fitzwilliam Depot
A	Shea, Augustus W.,	Nashua
B	Shea, Dennis M.,	Nashua
A	Shedd, George H.,	North Conway
A	Shedd, John Z.,	North Conway
A	Sherburne, Andrew Badger,	Portsmouth
C	Shultis, Frederick Charles,	Medfield, Mass.
A	Sikorsky, Vladimir Nicholas,	Salem
A	Simard, Emile,	Montreal, Can.
A	Smalley, Fred Lyman,	Reading, Mass.
A	Smart, Benjamin Horace,	Washington, D. C.
A	Smith, Albert W.,	Milford
A	Smith, Arthur Noel,	Dover
A	Smith, Carlisle Ouseley,	
A	Smith, Frank A.,	Lebanon
A	Smith, George Rufus, Hom.,	Dover
C	Smith, Harry Wilbur,	South Norridgewock, Me.
A	Smith, Henry O.,	Hudson



A	Smith, Herbert Llewellyn,	Nashua
A	Smith, Marvin F.,	Hampton
C	Smith, William Eugene,	Franklin Falls
A	Smith, William Thayer,	Hanover
B	Snedden, Claude M.,	Littleton
C	Snow, Samuel Dryden,	Conway
A	Soulard, Joseph Alfred,	Salmon Falls
B	Soule, Lewis Franklin,	Salem
B	Souter, William N.,	Washington, D. C.
A	Spaulding, James Alfred,	
A	Spaulding, Melville Cox,	Ashland
B	Spear, Frank E.,	Lisbon
C	Spear, Herman S.,	Medfield, Mass.
B	Spencer, George Albert,	Manchester
A	Spooner, Frank, Hom.,	Lancaster
A	Sprague, Edward George,	Barre, Vt.
B	Sprague, Fred Alvah,	Concord
A	Stackpole, Harry Hills,	
A	Staniford, Edward Read,	
B	Staples, Hall,	Grafton, Vt.
A	Staples, John Walter,	Franklin Falls
A	Stark, Gillis,	Manchester
C	Stark, Maurice Albert,	
A	Stearns, Henry C.,	Concord
B	Steele, Eugene Gillis,	North Conway
B	Stetson, Harry W.,	Bridgewater, Vt.
A	Steuart, Frederick Charles,	Long Island, N. Y.
A	Stevens, Charles N., Hom.,	Somersworth
A	Stevens, Edwin Dearborn, Hom.,	Francestown
A	Stevens, Jane Elizabeth Hoyt,	Concord
A	Stevens, John Andrew,	Union
A	Stevens, John B., Ec.,	Merrill's
B	Stevens, Michel Mallett, Jr., Hom.	
A	Stevens, Parker B.,	Exeter
B	Stewartstown, Charlotte Dodd,	Manchester

A	St. Hiliare, Joseph Louis Emile,	P. Q.
A	Stickney, Henry Ladd,	Manchester
A	Stillings, Ferdinand Anson,	Concord
A	Stillings, Levi Chamberlain,	Philadelphia, Pa.
A	Stockwell, Emmons F.,	Lancaster
A	Stokes, Dudley Leavitt,	Rochester
A	Stone, Melvin T.,	Troy
B	Story, Helen Louise,	Lowell, Mass.
B	Stowell, Edmund Channing,	Dublin
B	Stowell, Sarah Russell,	Dublin
A	St. Pierre, Servule,	Manchester
A	Straw, Amos Gale,	Manchester
A	Straw, Zatae Longsdorff,	Manchester
B	Sturtevant, Charles A., Hom.,	Manchester
A	Sturtevant, Charles B.,	Manchester
A	Sullivan, D. Edward,	Concord
A	Sullivan, James,	Manchester
A	Sullivan, Miah B.,	Dover
A	Sumner, Arthur F.,	Goffstown
A	Sweeney, Frederick C.,	East Jaffrey
A	Sweeney, Henry L.,	Kingston
B	Sweeney, Mary Agnes,	Nashua
A	Sweet, Robert V.,	Rochester
A	Swett, Eddy Benjamin,	Grasmere
A	Sylvain, Emile Auguste,	Manchester
C	Tabor, Edward Orlando,	Lowell, Mass.
A	Taft, Albert Atherton,	Winchester
A	Taft, Edward Harvey,	Milford
B	Taft, Maud Emilie,	Keene
A	Talbot, Bertell Laroy,	Peterborough
B	Tarbell, Wallace Henry,	Hopkinton
B	Taylor, Herbert Leonel,	Portsmouth
A	Taylor, Joseph,	West Manchester
A	Templeton, Wilbur Fisk, Ec.	
A	Theriault, Joseph,	Concord

A	Theriault, Joseph Horace,	Claremont
B	Thompson, Howard E.,	Bethlehem
B	Thompson, Joseph Mariner,	Mont Vernon
A	Thompson, Edward Henry,	Hampton
A	Thompson, Robert.	
B	Thompson, Wellington Andrew,	Manchester
B	Thorn, Edwin C.,	Brattleboro, Vt.
C	Thornburgh, Robert Montgomery,	U. S. Army
B	Thorning, William Burton.	
A	Tibbetts, James Thomas.	
A	Tobel, Frederic Von.	
B	Tobey, Fred Chamberlain,	Wolfeboro Falls
A	Todd, Arthur J.,	Manchester
A	Togus, Theodore M.,	Hooksett
A	Tolles, Clarence Weston.	Claremont
A	Tolman, George Averill,	Dover
A	Towle, Fred Scates,	Portsmouth
B	Towle, George Henry, Jr.,	Newmarket
A	Towne, George Dana,	Manchester
C	Toye, John E.,	Charlestown
B	Tracy, Edward Andrew,	Keene
A	Tremblay, Evariste Clement,	Manchester
A	True, Walter H., Ec.,	Laconia
A	Tucker, Edward M.,	Canaan
A	Tucker, Ira Allen, Hom.,	West Milan
A	Tuttle, Walter, Hom.,	Exeter
A	Twitchell, Walter Zeb., Hom.,	Andover, Me.
A	Twombly, Edward Everett, Ec.,	Colebrook
A	Twombly, John Herbert,	Milton
A	Underhill, George A.,	Nashua
A	Underhill, George Herbert.	
A	Underwood, David Gleason,	Bradford
A	Upham, Samuel Rice,	Claremont
A	Vaillancour, Romeo L.	
A	Valcour, Charles S.,	Nashua

B	Vallee, John Edward,	Lebanon
B	Varick, William Remson,	Concord
A	Varney, Albert H.,	Newfields
B	Varnum, Leavitt R. J.,	Lowell, Mass.
A	Verrill, Leon Gilbert,	Rochester
A	Wade, Edric Allan,	Salem
A	Wakefield, George Leonard, Hom.,	Manchester
A	Wakefield, Sidney S., Ec.	
A	Walker, Charles Rumford,	Concord
C	Walker, Charles Sidney,	Keene
B	Walker, Wallace D.,	Portsmouth
A	Wallace, Alonzo S.,	Nashua
B	Wallace, Arthur L.,	Nashua
A	Wallace, Ellen Alfreda,	Manchester
B	Wallace, Henry,	Tombstone, Ariz.
B	Wallace, John,	Roxbury, Mass.
A	Wallace, William F.,	Plaistow
A	Ward, George C., Hom.,	Sanbornton
C	Ward, Roy, Jr.,	Worcester, Mass.
A	Ward, Stanley M.,	Hampton
A	Ward, Joseph,	
B	Warden, John B.,	Lisbon
A	Warner, Franklin George,	Antrim
A	Wason, Eugene,	Milford
A	Watson, George Marshall,	Manchester
A	Watson, Irving Allison,	Concord
C	Watson, Maurice,	Manchester
B	Watts, Harry Adelbert, Hom.	
A	Way, Osmon B.,	Claremont
A	Weaver, Charles Albert,	New Boston
B	Weaver, George Albert,	Warren
B	Webb, Rollin Edward,	Lancaster
B	Webber, Norman B.,	Manchester
A	Weeks, Frank Sherman,	Milton Mills
B	Weeks, William Rufus, Hom.,	Manchester

A	Wellner, Hermann,	Chicago
A	Wells, Henry C.,	Laconia
A	Wesley, John Lyman.	
C	West, Hiram B.,	Bridgeport, Conn.
B	Weston, Arthur Francis, Hom.,	Keene
A	Weymouth, George Weare,	Lyme
A	Weymouth, Henry Augustus,	Andover
A	Wheat, Arthur Fitts,	Manchester
C	Wheeler, John,	Plymouth
A	Wheeler, Phineas H.,	Alton
A	Wheet, Fred Eugene.	Rumford Falls, Me.
A	Whitcomb, Charles Summer Fremont,	Contoocook
C	White, Herbert Augustus,	Somerville, Mass.
B	White, John Blake,	New York
C	Whitmore, Albra.	Hinsdale
A	Whitney, Frank E.,	Rochester
A	Whittemore, Sarah Eliza,	Manchester
B	Whittle, John Augustus,	Rochester, N. Y.
C	Wiborn, J. Auburn,	San Francisco, Cal.
B	Wiggin, Dayton Carroll,	Newfields
A	Wiggin, Henry Mayhew, Hom.,	Whitefield
A	Wight, Edward M.,	Gorham
A	Wilber, George Fisk,	Nashua
C	Wilder, Ralph Spencer,	Harding, Mass.
A	Wilder, Richard Edward,	Whitefield
A	Wiley, Maurice G., Hom.,	Boston, Mass.
A	Wiley, Rebecca W., Hom.,	Laconia
B	Wilkins, George C.,	Manchester
A	Wilkins, Russell,	Concord
A	Willey, Bertram E.,	Lyme
D	Williams, Harry George,	Gilsum
A	Williamson, W. D.,	Portland, Me.
B	Willis, John Embert,	Somersworth
A	Willis, John L. M.,	Eliot, Me.
C	Wilson, George Gordon Byron,	Lowell, Mass.

C	Wims, Dennis Patrick,	Uxbridge, Mass.
B	Wing, Persus W.	
B	Woodbury, Benjamin C., Jr., Hom.,	Portsmouth
A	Woodbury, Frank Taylor,	Wakefield, Mass.
B	Woodman, James B.,	Franklin
A	Woodman, Milton Sawyer,	West Lebanon
A	Woodward, Josiah N.,	Nashua
A	Worcester, Frank D., Hom.,	Keene
C	Worthen, Eugene Mark,	Ashland
B	Worthing, Frank Bertelle.	
A	Wright, Elam Rust,	Alton
A	Wrisley, John Alson, Hom.,	Lakeport
C	Yeaton, George William.	Medway, Mass.
A	Young, John.	Farmington
A	Young, Oscar Cummings,	Charlestown
A	Young, Stephen,	Dover

## CHAPTER XII.

REPORT OF THE REGENT OF THE STATE BOARDS OF MEDICAL  
EXAMINERS.

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REGISTRATION OF TRAINED NURSES.

The General Court of 1907 enacted the measure recited herewith to secure the registration of trained nurses. The administration of the law was committed to this office.

## THE LAW.

## AN ACT to Provide for State Registration of Nurses.

*Be it enacted by the Senate and House of Representatives in General Court convened:*

SECTION 1. Any resident of the state of New Hampshire, being over twenty-one years of age and of good moral character, holding a diploma from a training school for nurses connected with a hospital giving a course of at least two years in the hospital and registered by the regent of the state boards of medical examiners as maintaining in this and other respects proper standards, all of which shall be determined by the said regent, and who shall have received from the said regent a certificate of his or her qualification to practice as a registered nurse, shall be styled and known as a registered nurse, and no other person shall assume such title, or use the abbreviation R. N. or any other words, letters or figures to indicate that the person using the same is such a registered nurse. Nothing contained in this act shall be considered as conferring any authority to practice medicine or undertake the treatment or cure of disease in violation of the medical practice acts of the state of New Hampshire. Any persons from other states registered by the said regent as maintain-



ing standards not lower than those provided by this chapter, who shall show to the satisfaction of the said regent that he or she is properly and duly registered for the practice of professional nursing in such states, upon the payment of the usual fees for certificate provided by this act, shall be entitled to a license to practice professional nursing in this state without an examination.

SECT. 2. Upon the taking effect of this act, the Graduate Nurses' Association of New Hampshire shall nominate for examiners ten of their members, who have had not less than five years' experience in their profession, and at each annual meeting of said association thereafter two other candidates. The regent of the state boards of medical examiners shall appoint a board of five examiners from such list. One member of said board shall be appointed for one year, one for two years, one for three years, one for four years and one for five years. Upon the expiration of the term of office of any examiner, the said regent shall likewise fill the vacancy for a term of five years and until his or her successor is chosen. An unexpired term of an examiner, caused by death, resignation or otherwise, shall be filled by the regent in the same manner as an original appointment is made. This board of examiners shall also act as inspectors of training schools. The said regent, with the advice of the board of examiners above provided for, shall make all necessary rules for the examination of nurses applying for certification under this act. Each person so applying for certification, or for examination and certification, shall be charged a fee of five dollars (\$5), which shall be used to meet the actual expenses of the regent and board of examiners. From the fees provided by this act, the regent shall pay all proper expenses incurred by its provisions, and any surplus at the end of any year shall be retained by said regent as a special fund for meeting expenses which may be incurred in any subsequent year. The members of the examining board shall be

paid by the regent the sum of five dollars (\$5) for each day actually engaged in the service, and all their legitimate and necessary expenses. Said fees and expenses shall be paid from fees received under the provisions of this act, and no part of the same shall be paid out of the state treasury. The said regent shall report annually to the governor the receipts and expenditures under the provisions of this act, and shall be held accountable therefor. The said regent may revoke any such certificate granted by him for sufficient cause after notice in writing to the holder thereof and a fair hearing thereon. Such notice shall be given by the regent to the party complained of at least fourteen (14) days before the day of hearing and shall contain a statement of the grounds upon which the complaint is based. The hearings upon such complaints shall in all cases be conducted in private, except upon the special request of the party complained of. No person shall thereafter practice as a registered nurse under any such revoked certificate.

SECT. 3. The regent of the state boards of medical examiners may, upon the recommendation of said board of examiners above provided for, waive the examination of any graduate in good standing holding a diploma from a training school connected with a hospital giving a training of not less than two years, and of such persons now in training at the time of the passage of this act in a hospital giving a two years' course and shall hereafter be graduated who shall apply in writing for such certificate within three years after the passage of this act, and shall also grant a certificate to any nurse of good moral character who has been engaged in the actual practice of nursing for not less than three years next prior to the passage of this act who shall satisfactorily pass an examination in practical nursing within three years hereafter.

SECT. 4. Nothing in this act shall be construed to affect or apply to the gratuitous nursing of the sick by friend or

members of the family, and also it shall not apply to any person nursing the sick for hire but who does not in any way assume to be a registered nurse.

SECT. 5. Any violation of this act shall be a misdemeanor, punishable by a fine of not less than \$50. Any person who shall wilfully make any false representation in applying for a license shall be guilty of a misdemeanor, and upon conviction be punished by a fine of not less than \$100 nor more than \$500.

SECT. 6. This act shall take effect upon its passage.

[Approved March 7, 1907.]

In obedience to the law, on March 7, 1907, I appointed the following persons to constitute the board of examiners provided for in the law:

For the term expiring 1908, Ida A. Nutter, of Laconia.

For the term expiring 1909, Ida F. Shepard, of Hanover.

For the term expiring 1910, Anna F. Alpaugh, of Portsmouth.

For the term expiring 1911, Augusta C. Robertson, of Manchester.

For the term expiring 1912, Blanche M. Truesdell, of Concord.

On March 7, 1908, I re-appointed Ida A. Nutter, of Laconia, for the term of five years and the board as constituted October 1, 1908, is as follows:

Ida F. Shepard, of Hanover, term expires 1909.

Mrs. Edwin C. Blaisdell, of Portsmouth, term expires 1910.

Augusta C. Robertson, of Manchester, term expires 1911.

Blanche M. Truesdell, of Portsmouth, term expires 1912.

Ida A. Nutter, of Laconia, term expires 1913.

President of the board, Miss Truesdell.

Secretary, Miss Robertson.

The board has recommended and the regent has registered 152 qualified nurses under section 3 of the law without examination. Two persons have been duly examined by the board, recommended to the regent and registered by him, under the provisions of the same section. The board has rejected three applicants of the former class.

The regent has required of the board the recommendation of a list of hospital training schools for approval by him in accordance with section 1 of the law. The board has given this matter due consideration and has not yet made its report. It is understood that under the terms of the law, this section will not in effect become operative until 1910.

It is the intention of the board and the desire of the regent that conditions of approval should be elaborated which will secure an adequate standard of professional preparation, which will be reasonable and capable of attainment by the various hospitals, and which will not depart widely from the practice of other states. This amounts to a task of considerable intricacy and one which requires much time especially since the board charged with its execution is composed of nurses actively engaged in the practice of their profession.

A complete list of registered nurses is here given:

## LIST OF REGISTERED NURSES.

---

Alexander, Margaret Ella,	Concord
Allen, Mabel A.,	Nashua
Allison, Ina M.,	Claremont
Alpaugh, Anna F.,	Lebanon, N. J.
Ashe, Annie A.,	Littleton
Awde, Ethyl M.,	Whitefield
Ayer, C. Josephine,	Manchester
Bailey, Jessie,	Manchester
Bailey, M. Ethel,	Manchester
Baker, Mary F.,	Concord
Bemis, Jennie L.,	Claremont
Bianchi, Annina,	Littleton
Bingham, Myrtie Morse,	Bristol
Boulanger, Alida M.,	Laconia
Britton, Katherine,	Long Branch City, N. J.
Brown, Annie W.,	Concord
Brunner, Maude A.,	Concord
Bullock, Amelia J.,	Concord
Bulmer, Ida Florence,	Plymouth
Burke, Jennie,	Littleton
Butterfield, Maude Proud,	Suncook
Cameron, Alice,	Manchester
Cameron, Annie M.,	Manchester
Cameron, Christina,	Manchester
Caverly, Anna Maud,	Meredith
Chadwick, Mary E.,	Penacook
Chisholm, Henrietta Bruce,	Exeter
Clancy, Mary Ellen,	Woodsville
Coburn, Elizabeth Ames,	Claremont
Crosby, Mrs. Eva Emery,	Concord

Cummings, Mary E.,	Malden, Mass.
Curtice, Nancy Velona,	Concord
Davis, Cora E.,	Lakeport
Desmond, Margaret K.,	Concord
Doherty, Minnie A. J.,	Manchester
Dunbar, Vernetta Florence,	Concord
Dutcher, Ethelyn G.,	Concord
Evans, Ada Avery,	Concord
Farr, Nellie E.,	Littleton
Ferguson, Annie Isabel,	North Weare
Field, Katherine M.,	Portland, Ore.
Fisk, Eunice Annette,	Concord
Fitch, Florence R.,	Hanover
Flanders, Minnie L.,	Warner
Fontaine, Jennie M.,	Pembroke
Fox, Fidellis Anna,	Rutland, Vt.
Gage, Mary Louise,	Hooksett
Gibson, Lillias M.,	Manchester
Glidden, Clara V. Stevens,	Concord
Gordon, Ella M.,	Enfield
Hall, Carrie May,	Nashua
Hall, Mabel Olive,	Concord
Harris, Eva Maud St. Clair,	Concord
Haskell, Grace Peck,	Dover
Haslem, Clara,	North Billerica, Mass.
Hayden, Sarah Mabelle,	Keene
Hemphill, Myra Ordway,	Concord
Henderson, Agnes E.,	Hanover
Hildreth, Gertrude E.,	Littleton
Hill, Florence Boardman,	Portsmouth
Hislop, Christine Ann,	Portsmouth
Hocks, Mary,	Concord
Hogan, Helena E.,	Concord
Horton, Harriet Winifred,	Hanover
Howe, Ada Maybella,	Concord

Hubley, Adelaide Estano,	Concord
Irvin, Sara C.,	Claremont
Joy, Katherine F.,	Manchester
Kelly, Alice Marjory,	Manchester
Knapp, Emma Eleanor,	Woodsville
Knox, Lillian L.,	Hanover
Landers, Mae,	Rutland, Vt.
Lane, Harriette E. M.,	Manchester
Lane, Susan Klein,	North Hadley, Mass.
Lawson, Hilda Olivia,	Concord
Lee, Mary Virginia,	Manchester
Lippeus, Corinne L.,	Hanover
Lockerby, Anna Cora,	Hanover
Lord, Rena Thompson,	West Ossipee
McConnell, Margaret,	Concord
McDerby, Anna Frances,	Bedford
McDevitt, Mary Agnes,	Keene
McDiarmid, Mary Wilson,	Woodsville
McFarlane, Jessie,	Carleton Place, Ont.
McIntire, Mae S.,	Whitefield
Maclean, Eldya D.,	Concord
McLean, Lena J.,	Keene
McLean, Luella Maud,	Portsmouth
McPartland, Emma T.,	Manchester
Madden, Sarah A.,	Colebrook
Malone, Margaret Mary,	Berlin
Mansfield, Edith Etta,	Manchester
Martin, Katherine V.,	Manchester
Merrifield, Bertha Z.,	Charlestown
Messer, Jennie Belle,	Manchester
Messer, Mary Abbie,	Manchester
Miller, Annie Elizabeth,	Concord
Mitchell, Margaret E.,	Concord
Morey, Ada Jane,	Hanover
Murphy, Elizabeth M.,	West Concord



Murray, Mary.	Keene
Muzzy, Hattie Spaulding.	Acworth
Nelson, Mary Ann.	Dover
Nightingale, Minnie C..	Concord
Nutter, Ida A..	Newington
O'Donoghue, Rosanna,	Concord
O'Hara, Margaret C..	Concord
Oldfield, Della M..	Lancaster
Olding, Nancy G..	Merigomish, Nova Scotia
Page, Gertrude,	Dover
Pike, Mary Ann,	Lakeport
Potter, Mabel,	Manchester
Pressey, Melissa H..	Concord
Randall, Edith M..	Northwood
Reynolds, Georgia Elizabeth.	Manchester
Richardson, Emma L.,	Kittery, Me.
Rittenhouse, Selina O.,	Keene
Rix, Florence E.,	Littleton
Robbins, Ina Christie,	Hanover
Robertson, Augusta Chaplin,	Manchester
Robinson, Frances Eleanor,	Concord
Rollins, Lillian P.,	Malden, Mass.
Rose, Elsie,	Dover
Rugar, Nellie M.,	Manchester
Seaver, Mabel Jean.	Lebanon
Shears, Winifred M.,	Concord
Shepard, Ida Frances.	Hanover
Smith, Jean,	Woodsville
Smith, Mary Agnes.	Fall River, Mass.
Smith, Mary Elizabeth,	LeMesurier, Quebec
Snell, Edna Bernice.	Dover
Stearns, Mary Elizabeth,	Manchester
Stevens, Blanche Pauline.	Gloucester, Mass.
Streeter, Della E.,	Concord
Sullivan, Ruth M.,	Manchester
Thomson, Robina L.,	Manchester

Tousignant, Diana Margaret.	Franklin
Trudeau, Anna A..	Manchester
Truesdell, Blanche Montross.	Concord
Tupper, Ansel.	Nashua
Underhill, Lottie Mary Beatrice.	Woodsville
Urquhart, Tena A..	Concord
Van Vranken, Ada J..	Concord
Varney, Mary Leo.	Manchester
Walker, Bertha Laura.	East Andover
Wallace, Abbie Ann.	Lakeport
Walmsley, Alice.	Manchester
Webber, Harriet B..	Manchester
Westover, Lona A..	Wolfeboro
Wheaton, Eliza.	Newbury, Vt.
Wheeler, Alma Ardella.	Lakeport
Wiren, Mary Alice Gertrude.	Nashua

As required by law, I add a statement of receipts and expenditures to the close of the fiscal year, August 31, 1908.

## FINANCIAL STATEMENT.

## RECEIPTS.

156 fees for registration, at \$5.....	\$780.00
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## EXPENDITURES.

Postage .....	\$5.00
Office furnishings .....	15.30
Printing blanks, stamped envelopes, etc., .....	59.61
Expenses of board .....	146.62
Fees returned .....	30.00
Clerical expenses .....	205.50
	----- \$462.03

Balance on hand September 1, 1908.....	\$317.97
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## CHAPTER XIII.

ROUTINE WORK OF OFFICE.

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A report upon the "doings of the superintendent" would not be complete without an account of the activities of the office force proper. As the work of the department has increased from year to year, the load upon the central office has been increased many fold. No enterprise of any considerable magnitude can accomplish results unless it has as one of its working parts the systematizing force of an efficient central clearing house. Originally, little more than a room in which the superintendent of public instruction could be found when at the state capital and in which he could set up his desk; the increase in the number of calls upon the department made by the local authorities, the increase in the number of laws in the administration of which the department is concerned, the activity of the superintendent in the field, the gradual discovery and perfecting of methods by which the department can forward the original purpose of its establishment, namely the unification of the educational forces of the state,—all these have joined together to make the office of the superintendent of public instruction one of the busiest in the state government.

The office work I have placed under the general direction of Miss Harriet L. Huntress, long the faithful and eminently efficient secretary of the superintendent. Miss Huntress, beside exercising a general oversight of the work of the office itself, keeps informed so far as possible of all the multitude of occurrences about the state in which the department may have to be interested; carries on a large part of the correspondence, so that any person writing the department will not have to wait for his answer beyond

two or three mails; keeps the books, and pays the bills of the department; keeps the records and directs the details of statistical inquiries; oversees the details of the registration of physicians, surgeons and trained nurses.—in a word, keeps the office running on schedule time independently of the presence of the superintendent. Miss Jessie M. Williams has been regularly employed during the period of two years, partly as stenographer but chiefly as concerned with that part of the statutory duties of the office which require it to “receive, preserve, or distribute all state documents in regard to public schools or education, and to receive and arrange reports and returns of school boards.” Miss Williams has also helped upon the statistical work, upon mailing, and upon the preparation of many manuscripts. Her experience and her excellent judgment in searching the materials at hand and classifying the same have contributed very materially to the efficiency of the office. Miss Bernice M. Adams, a graduate of the Concord high school in the class of 1907, and without other training than that received in that institution, has for the past year in the capacity of stenographer and typewriter handled with accuracy and intelligence practically the entire correspondence of the office.

The work of the central office is summarized and accounted for as follows:

I. *The general correspondence of the office*, including that of the regent, has amounted to about 7,200 first class letters annually.

II. *Securing, verifying, and classifying statistical and other reports.*

The returns necessary for the administration of the school laws of the state, and which must be made to this department annually by the local school officers, amount to nineteen documents annually, six of these from each of two hundred and fifty-eight school districts, and thirteen

from each of seventy-five approved secondary schools. Many of this aggregate number are secured only after repeated requests; all of them must be examined to see if they are consistent, and verified by all the data in our possession; the majority become the subject of more or less prolonged correspondence; and finally all must be classified and summarized before the data can be used.

III. *The arrangement of the returns of school boards* required by the statute, simple as it looks on the printed page, is a formidable undertaking if the contemplated arrangement is to be made available for use. It is one thing to pile up pamphlet returns in orderly tiers year after year; it is quite another thing so to arrange such returns as to make them yield needed information upon any given point at once. The office has aimed to accomplish this last result in the following manner:

1. The statistical reports from the several districts are each summarized in such a manner as to give the facts most often needed. These facts are transferred to cards so arranged that corresponding items for each year stand side by side,—thus showing up incidentally any considerable error,—and the card is large enough to hold the data for six years. The original sheets upon which the returns are made are then arranged in alphabetical order by towns, and by subjects, in such a manner that any item desired, in any town, in any year since 1904, can at once be shown from the original entry.

2. The work reports from the various high schools and academies, together with information of various other forms concerning these institutions, have been gathered, arranged, edited, indexed, and bound up, so that any important item of information concerning any one of the schools,—from the qualifications of the principal to the number of pupils who passed in first year English,—can be at once turned up. These volumes will in a few years come to be of immense historical and educational value.

3. Various documents dealing with particular items, such as amount of appropriation at the annual spring meeting, or amount paid for high school tuition, have been also either bound up in permanent form or have been transferred to cards and become at once data for checking up later returns.

IV. *The scrutiny of financial returns.* A particularly close scrutiny of financial returns has been made during the past two years, with the object of securing (1) more definite returns and (2) more reliable returns. The accounts of most districts appear to be kept in happy ignorance of the restraints of bookkeeping, and it is consequently a matter of great difficulty to secure either definite or reliable returns. The situation is further complicated by the statutes which make towns responsible for some portions of the outlay upon schools and districts responsible for other portions. By dint of scrutiny, comparison, correspondence and inference, progress has been made and the financial parts of the statistical tables in the appendix of this volume are probably the most reliable ever published.

In addition to the above, a close study has been made of the financial returns, district by district, covering a period of several years. The process has been laborious and is not complete, but sufficient information was at once derived to make it evident that in the aggregate a large sum of money had been tied up by illegal management. This matter at once became the subject of a circular addressed to school boards, and, in some cases, of direct representations to the school boards by the state superintendent.

In connection with the above has come the preparation of summarized returns to the state treasurer, together with the necessary computations. Such preparation, particularly in the case of rebates for high school tuition, involves



a large amount of correspondence before the returns from the towns can be made to check up with those from the high schools and academies. One local school officer, for instance, reports on inquiry that he had supposed that an *estimate* was all that was required.

V. *Systematic records of the results of child labor inspection* have been devised and brought up to date. \*

VI. *Cataloguing and filing pamphlets and other educational documents.* An important function of the department is the collection of material published by other states, by educational societies, and by foreign governments, relating to public education. A large amount of this material is constantly received by this office. Much of it is of no apparent immediate value, but in the long run any particular publication is apt to be needed and needed badly at some time. To the best of my knowledge, such material has never been collected and classified where it could be immediately available. During the past year, all such material having any possible future value, has been collected, filed and indexed and the files are kept up to date. The office is now better prepared to answer the large number of questions asked by local authorities or interested citizens seeking information on a large variety of educational matters.

VII. *Court decisions catalogued.* The department is and always has been constantly asked by local authorities to explain and instruct with reference to the local administration of the school law. Most such queries relate to simple interpretations of the statutes, upon which nothing further than the attentive reading of the same is needed. Numerous others relate to such matters as, for instance, the legality of corporal punishment, upon which the statutes are silent, but upon which there is a multitude of decisions by the courts. Others still lead to legal complexities upon which the opinion of the attorney-general



must be sought, which has always been generously given; cases of the last-named class are, however, infrequent.

For convenience and greater efficiency in dealing with this work, the office has begun a card catalogue of the court decisions of all states, which when complete will be kept up to the last monthly issue of the American Digest. The catalogue has been so arranged as to yield at once all the available information upon any ordinary inquiry relating to the lawful administration of the public schools.

VIII. *Machinery for the registration of trained nurses.* During the two years, the office has devised and put into operation the moderate amount of administrative machinery required for the newly enacted nurse registration law.

IX. *Registration of physicians and surgeons.* The office has mailed blanks, scrutinized and verified qualification papers, conducted examinations, issued and recorded or denied licenses to fifty physicians and surgeons.

X. *Publication and mailing.* The office has prepared manuscript, corrected proof, and mailed or expressed the following list of documents and publications:

Approved List of Apparatus for Physics in the Secondary Schools.

Approved List of Apparatus for Chemistry in the Secondary Schools.

Payment of High School Tuition.

Circular Letter on Teachers' Institutes.

New Hampshire Approved Schools.

Reading for Older Pupils.

Membership and Non-membership.

Instruction in Physiology and Hygiene.

Examination for Teachers' Certificates.

Circular with Reference to Program of Studies for Secondary Schools.

Educational Exhibit at Jamestown.

- Instructions Concerning School Work.
- Circular Letter with Reference to Arbor Day.
- Circular Letter with Reference to Jamestown Day.
- Circular Letter with Reference to Memorial Day.
- Observance of Memorial Day.
- Circular Letter on Secondary Schools.
- The Powers and Duties of School Boards.
- Consolidation and Transportation.
- Circular Letter with Reference to Examination Papers.
- Circular Letter on High School Tuition.
- Summer Institute for Teachers.
- Circular Letter on Transportation.
- Circular Letter on Science Equipment in Secondary Schools.
- Flag and Staff.
- Attendance and Child Labor.
- Circular Letter with Reference to Enumeration of Children.
- Literacy Tests.
- Circular Letter with Reference to Irregular Attendance at High Schools.
- Original Work in Geometry.
- List of Present Supervisory Districts in Order of Establishment Under Law of 1899.
- Article for Warrant in District Meeting Regarding Professional Supervision.
- Regulations Governing the Examination and Certification of Teachers in the Public Schools.
- Circular With Reference to New Apportionment of State Tax.
- A List of Professional Reading for Teachers.
- Circular Letter with Reference to Cleveland Disaster.
- Professional Supervision of Schools.
- Eight Years of District Supervision.
- Map of New Hampshire Showing Towns Under Supervision.

Preliminary Circular in Relation to the Approval of Training Schools for Nurses.

Circular Letter with Reference to Unexpended School Money.

Circular Letter with Reference to Notifying School Boards of Attendance of Children at High Schools.

Use of Schools for Pernicious Advertising.

Circular Letter with Reference to Patriotic Exercises and the United States Flag.

Circular Letter with Reference to High School Report Blanks.

Professional Supervision.

School Registers.

Some Practical Hints on the Hygiene of the Schoolroom.

Cards for testing vision.

It should be understood that, while all the foregoing has been laid out and has been under the general oversight and direction of the superintendent, it has been carried out almost entirely by the office force. The superintendent's work has been chiefly in the field.

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## CHAPTER XIV.

### EXPENSES OF THE OFFICE.

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I hereby submit report of the expenditures of the department for the year beginning September 1, 1907, and ending August 31, 1908, as required by chapter 98, Session Laws of 1907.

It should be noted that this report does not include expenditures under the Institute Fund, which will be found

in Chapter VIII. nor of the Regent, which will be found in Chapters XII and XIII, Part I.

Salaries,	\$3,500.00	
Stenographer,	525.66	
Office furnishings,	288.04	
Printing,	709.92	
Postage,	529.52	
Telephone,	131.68	
Telegraph,	9.32	
Factory inspection and truancy,	1,510.14	
Mileage paid to secretary of state,	110.00	
Superintendent's traveling expenses,	130.13	
Express,	125.36	
	-----	\$7,569.77

## PART II.

# CONDITION AND PROGRESS OF EDUCATION.

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The law requires in the biennial report of the superintendent of public instruction a "statement of the condition and progress of popular education in the state." In obedience to the law, I submit the chapters which follow:

### CHAPTER I.

#### PROGRESS: COMPARATIVE STUDY OF ENROLMENT AND ATTENDANCE.

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In any statement of progress it is difficult to separate means from ends,—actual items of progress from improvements in methods believed by the writer to be progressive. In any effort dealing with such highly complex sociological problems as does the public school system, it becomes almost impossible to say with assurance just what gains have been made in the ultimate purpose of the system, namely, the making of good citizenship. If, however, we set out to accomplish results with our public school system, we are at least bound to scrutinize its parts and see whether they are working as contemplated. For instance, if we find that a larger proportion of pupils are attending school, a larger proportion remaining in school, and a larger proportion entering and graduating from the high school, then we know that the public school system is at least leaving its mark upon a larger proportion of our prospective citizenship.

TABLE No. 18.  
SHOWING INCREASING RATIO OF ATTENDANCE.

	1860	1870	1881	1890	1900	1906	1908
1. Different public schools.....	*	*	2,657	2,302	2,198	2,136	2,127
2. Graded schools.....	*	*	502	604	773	1,112	1,234
3. Percentage of graded schools.....	*	*	19	27	35	52	53
4. Schools averaging twelve or less pupils.....	*	*	785	632	490	512	383
5. Schools averaging six or less pupils.....	*	*	297	176	119	97	117
6. Membership.....	94,178	69,762	63,319	58,986	53,729	55,232	54,472
7. Daily attendance.....	54,623	45,755	43,943	41,526	47,276	49,793	49,398
8. Percentage of attendance.....	58	66	69	70	87	90	90
9. No. of pupils of school age reported not attending any school.....	1,922	5,743	4,445	1,623	*	*	108
10. Enrolment in high schools and approved academies, tuition paid by town.....	*	*	*	*	4,255	45,803	46,289
11. Enrolment in private schools.....	*	*	3,652	7,750	10,015	12,916	14,313
12. Average length of schools in weeks.....	20.7	17.1	19.4	26.6	27.5	31.5	31.8

\* No data. † Includes academies approved under law of 1901.

## RATIO OF ENROLMENT TO CENSUS.

The first question which naturally occurs is, How large a percentage of the total number of children of school age are going to school? The statutes of New Hampshire do not constitute any range of ages as "school age," unless the census requirement "between the ages of five and sixteen" constitutes such a school age.

Prior to 1895, the school census was usually taken by the assessors of taxes as a part of their duty. Since that date it has been made by the local truant officer or by some other agent appointed by the school board. Under the former arrangement, the enumeration was entirely worthless, since at times it would report scarcely one-half the children known to be in school. Under the present arrangement, although far from being strictly reliable, the returns are a vast improvement on those formerly made. They will never be what they should be until the public school system of the state as a whole is overlooked by men trained for the purpose and who have no other business.

The census returns for the last school year have been looked after by this department as never before. They were all made and reported during the fall term as required by law, so that they correspond with the enrolment in schools as made for the current year. Since the department has no control over the original entries, it cannot vouch for their accuracy. It appears, then, that the enumeration of children at the beginning of the school year showed a population between the ages of five and sixteen of 74,065. As a partial check on this value, it may be said that the figures show an increase over the preceding year of 3,633, while the known enrolment of children within the years specified, including both private and public schools, remains about the same. Again, the United States census of 1900 showed a population within these ages of about 82,000; the school census for the same year



showed an enumeration of 71,544. It is, therefore, to be suspected that the increase over last year's census is mainly due to greater diligence in securing the same.

Now 13,693 pupils are reported as attending parochial schools, and 620, other elementary private schools. Of the former, a large number were under five and the remainder chiefly between five and sixteen, in just what proportion we have no means of telling. Making proper allowance for duplicate enrolments and for children in parochial schools under the age of five, we have a total enrolment of children between the ages of five and sixteen about equal to that given by the enumeration. But we know that 1,744 children of the age in question were in factories and in other employment, besides those reported as not attending anywhere and those in institutions such as orphanages, the school for feeble-minded, the industrial school, etc.

Again, a scrutiny town by town shows a discrepancy of 1,516 pupils between the truant officer's enumeration and those actually registered, the former being the larger. Of course, this discrepancy is more than offset by the aggregate number of cases in which enrolment within the ages specified is more than the enumeration. However, in the latter class of cases, the larger enrolment would undoubtedly be accounted for by the fact that children had moved into town since the enumeration was made. On the other hand, in the case of children who moved *out of town* after the enumeration was made, it is extremely unlikely that they would have disappeared without getting their names into the registers for at least two weeks' attendance, if they had gone to school at all.

From all these considerations, I conclude that the enumeration is probably too small by at least 3,000 and by at the most 8,000. Setting it at the latter figure, we should have as an outside estimate 82,000 children between the ages of five and sixteen in the state. Of these approxi-

mately 75,000 are accounted for in the public and private schools and as legally employed in factories. Where are the other 5,200? In the first place, a large number of them are children between the ages of five and eight lawfully detained at home by their parents, another considerable number, probably less than 1,000, are in orphanages, the school for feeble-minded, the industrial school and similar institutions. The remainder, precisely how large a number we cannot say, are doubtless in various stages of educational neglect.

It is safe to conclude, therefore, that at least 94 per cent. of all children in the state between the ages of five and sixteen are or have been regularly enrolled in some educational institution. The true percentage may be and probably is several points higher, but even at the point named it is a very creditable one as compared with that of the past, and with that of other states.

The number of children of legal compulsory school age reported as not attending, namely 108, is without doubt too small. It represents all such children as are known to the reporting officer, and as such can confidently be compared with the corresponding reports for 1870, 1881 and 1890, much to our comfort. The ratio of 108 to 4,445 probably fairly represents the truancy of 1908 as compared with that of 1881. The actual number of children regularly and unlawfully absent from school is undoubtedly much larger than 108, but at the worst it cannot be very large, not more, probably, than one per cent. of the total number of children within the compulsory ages. And this number would include those classes unavoidably kept from school by chronic maladies of one sort or another.

Altogether the attendance record of our schools is one in which the people may take a genuine and well-founded pride.

Improvements can evidently be made at the following points:

I. The school census must be taken with greater promptness and greater thoroughness every year. It is recommended that all school boards use the card method, entering all the data for each child upon the same card, the card then to be filed away for use in subsequent years. The census is the only way by which we can establish our base line and ascertain just how many and what children we have to deal with.

II. The department of public instruction must obtain more complete reports from all classes of institutions dealing with minor children, and the reports must be better classified than they now are.

III. The local school authorities must keep unceasing vigilance to see that every child is required to attend either the public schools or some private school or some special institution. We should not be satisfied with anything short of 100 per cent. of all children accounted for.

#### CONSOLIDATION AND GRADING OF SCHOOLS.

Items 2-5 show the tendency of rural schools toward consolidation, and its next step, which is grading. One of the conspicuous vicious effects of the district system, abolished in 1885, was the multiplication of very small schools. While there are still more very small schools than we could wish, the table shows that it is becoming more and more the policy of the towns to combine several small schools into one large school. During the past two years almost as many of these small schools have given place to larger ones as during any preceding ten years. The unprecedented change during the past two years, however, is not to be attributed entirely to consolidation. There has been, on the contrary, a marked tendency in different parts of the state, but especially along the southern boundary, for existing small schools to fill up by the influx of new families and the advent of new children.

Hand in hand with the discontinuance of the small

school has gone the grading of schools. Prior to 1881, a date chosen as the beginning of the era of more complete reports, practically all schools outside of the cities and larger villages, were ungraded. A gain of from 19 per cent. in that year to 53 per cent. in 1908 is the record. It should be observed here, too, that the process has been accelerated, that progress has been more rapid in recent years. Thus, during the period 1881-1890, an average of nine schools per year were graded; between 1890 and 1900, seventeen schools per year; between 1900 and 1906, fifty-seven schools per year, and during the last two years, sixty-one schools each year. Progress here is probably due to two factors, in part a larger number of wide-awake school boards and to a greater extent to the spread of professional supervision.

#### REGULARITY OF ATTENDANCE.

The percentage of daily attendance has reached 90, a point at which it has been stationary for the past three years, and from which it cannot advance greatly. Not far from an average of 10 per cent. in the state as a whole must be allowed to bad weather, sickness and other unavoidable causes. Few items speak better for that progress which is, if not fundamental, at least of primary importance, for there can be no expectation of efficient schooling, no matter how excellent the teaching, unless attendance is regular.

#### EXTENSION OF THE SCHOOL LIFE—HIGH SCHOOL ENROLMENT.

A matter which has been raised to great prominence during the past year in other states has been the extent to which children drop out of school. It has been pointed out many times that comparatively few children ever get beyond the lower grades, and the question has been raised,

Is not our whole American system seriously, if not fatally, defective?

Unquestionably, a smaller proportion of children pass completely through the school system than we could wish. It is not fair, however, to consider the subject from the data at hand during any one year. Rather viewed from the consideration of many years, so as to find the trend, would seem to be the only just method. It is, for instance, a dispiriting thing to find that the number of pupils who reach high school in a given city is only ten per cent. of those who might have done so, but a very encouraging thing to find that the enrolment in American secondary schools has increased 150 per cent. while the population has been increasing 21 per cent. In the nation at large, between 1890 and 1900, this ratio of increase held true, giving evidence that a constantly larger proportion of pupils were passing through the entire course from primary to college.

It is regrettable that we are unable to give the enrolment of pupils for each year for the entire state, showing the progress of pupils through the schools and the proportion dropping out annually. This has not been done, and under existing conditions of lack of grading cannot be done. From the data derived from high school and academy enrolment, however, we can reach useful conclusions.

TABLE No. 19.  
SHOWING RATIO OF HIGH SCHOOL AND ACADEMY ENROLMENT TO TOTAL ENROLMENT.

	1902	1903	1904	1905	1906	1907	1908
Total membership.....	55,489	53,968	54,957	55,679	55,232	55,236	54,472
High school membership.....	3,142	3,772	4,132	4,444	4,984	5,302	5,546
Academy membership, tuition paid by town.....	690	767	802	793	819	812	743
Total public secondary school membership.....	3,832	4,539	4,934	5,237	5,803	6,114	6,289
Percentage in secondary schools.....	6.9	8.4	9.1	9.4	10.5	11.2	11.5
Average annual increase in secondary membership.....	10.7%						

It appears that the percentage of pupils attending high schools or academies, exclusive of those who are strictly private pupils, has increased by two-thirds in a period of six years. Now these pupils all had to pass through the elementary schools in order to reach the high school at all. It is, therefore, evident that the proportion of pupils who remain in school long enough to have attended high school is increasing rapidly. That is the tendency of normal growth.

Precisely how large a proportion of the pupils who complete the course of study in the elementary schools, afterward enter the secondary school, we have no means of telling. The following table tells something:

TABLE No. 20.

Showing ratio of pupils finishing grammar school course in June, 1907, to pupils entering high school or academy in September, 1907, in certain districts.

Per cent.		Per cent.	
1. Milford .....	100	9. Wilton .....	80
2. Berlin .....	96	10. Littleton .....	80
3. Rochester .....	93	11. Keene .....	79
4. Claremont .....	90	12. Concord .....	70
5. Franklin .....	88	13. Laconia .....	67
6. Portsmouth .....	87	14. Manchester .....	65
7. Nashua .....	81	15. Derry .....	40
8. Dover .....	80	Average .....	80



TABLE No. 21.

Showing ratio of pupils finishing grammar school course in June, 1908, to pupils entering high school or academy in September, 1908, in certain districts.

	Per cent.		Per cent.
1. Amherst .....	88	27. Littleton .....	80
2. Antrim .....	93	28. Manchester .....	59
3. Bath .....	100	29. Milford .....	90
4. Berlin .....	100	30. Milton .....	95
5. Boseawen (special) ..	86	31. Nashua .....	75
6. Charlestown .....	100	32. Newmarket .....	100
7. Claremont .....	88	33. Newport .....	100
8. Colebrook .....	100	34. Penacook .....	97
9. Concord .....	86	35. Peterborough .....	93
10. Derry .....	70	36. Pittsfield .....	85
11. Dover .....	80	37. Plymouth .....	90
12. Epping .....	100	38. Portsmouth .....	93
13. Exeter .....	76	39. Rochester .....	93
14. Fitzwilliam .....	100	40. Salem .....	33
15. Franklin .....	76	41. Somersworth .....	96
16. Groveton .....	100	42. Stratford .....	91
17. Hanover .....	90	43. Stratham .....	100
18. Haverhill .....	96	44. Tilton .....	86
19. Hill .....	33	45. Troy .....	100
20. Hillsborough .....	86	46. Walpole .....	92
21. Hopkinton .....	100	47. Warner .....	100
22. Jaffrey .....	100	48. Whitefield .....	93
23. Keene .....	93	49. Wilton .....	55
24. Laconia .....	80	50. Wolfeboro .....	90
25. Lancaster .....	98	51. Woodsville .....	100
26. Lebanon .....	88		
Average.....		88 per cent.	

The list of towns does not represent the whole state. It probably does represent closely the situation in all

towns and cities in which an high school or academy is located. At all events the result in a population aggregating over one-half that of the whole state shows about as large a proportion moving on from the lower school to the high school as could probably do so with profit. It is doubtless much higher than has generally been supposed.

As to the proportion of all pupils in the state who pass on to the higher schools, we can only make a tolerably shrewd guess. Since the total membership for the past year was 54,472, and the secondary school membership 6,289, and remembering that the maximum high school enrolment is not more than one-third the total, we may infer that at least 50 per cent., in round numbers, of all the children attending the public schools of the state have in recent years passed into schools higher than elementary. It should, of course, be observed that the great majority of the children enjoying such privileges must have been in the urban and village communities and not in the country towns.

#### LENGTH OF SCHOOLS.

The length of the school year furnishes in practice a rough gauge by which to compare progress. True, it is often argued that a school of twenty weeks with a good teacher is better than one of forty weeks with a poor teacher. The argument would be sound if there were in practice so great a difference between available teachers. Under existing conditions, about the same grade of teacher will be found in a given town whether its school year is twenty weeks in length or thirty weeks. This being the case, the longer school year is to be taken as evidence of better schooling for the children, particularly as better teachers and improved teaching are usually found in practice to go hand and hand with the longer year. An

increase of over five weeks in the average school year of the state since the present decade came in and a school year nearly doubled within the last quarter-century are evidence of progress.

Here, as elsewhere, an *average value* does not tell the whole story. It will be seen by examining the statistical returns of the towns given in the appendix that *56 per cent.* of the whole school membership of the state is in towns in which the school year is thirty-six weeks or over, thirty-six weeks being taken as the maximum profitable length. It is to be hoped that this percentage will continue to rise until it reaches 100 per cent. The list of districts maintaining thirty-six weeks or over the past year is here given.

TABLE No. 22.

DISTRICTS MAINTAINING THIRTY-SIX WEEKS OR OVER FOR  
SCHOOL YEAR 1907-1908.

Belknap County.	Grafton County.
Laconia.	Bath, Special.
Tilton, Union.	Bristol, Special.
Carroll County.	Canaan, Special.
Wolfeboro.	Franconia, Special.
Cheshire County.	Franconia.
Keene.	Hanover, Special.
Troy.	Lebanon, Special.
Coos County.	Lebanon, West.
Berlin.	Lincoln.
Colebrook, Special.	Lisbon, Special.
Stewartstown, West.	Littleton.
Stratford.	Woodsville.
Whitefield, Special.	Hillsboro County.
Grafton County.	Goffstown, Special.
Ashland, Special.	Greenville.

Hillsborough County.	Rockingham County.
Hillsboro, Special.	Newfields.
Manchester.	Newington.
Merrimack.	Newmarket.
Milford.	North Hampton.
Nashua.	Plaistow.
New Ipswich.	Portsmouth.
Peterborough.	Rye.
Merrimack County.	Salem.
Allenstown.	Stratham.
Boscawen, Special.	Strafford County.
Concord, Union.	Dover.
Penacook.	Durham.
Rockingham County.	Farmington, Town.
Brentwood.	Farmington, Special.
Derry, Special.	Milton.
Derry, Town.	Rochester.
Epping.	Somersworth.
Exeter.	Sullivan County.
Greenland.	Claremont.
Hampstead.	Newport.
Newcastle.	

In excuse for the short term given in some towns it is urged that twenty to twenty-five weeks is as long a year as weather conditions in country towns will permit. In the light of the facts such an objection does not hold.

In the first place, between the first of September and the end of June there is room for from thirty-two to thirty-four weeks, making all due allowance for a brief fall vacation of two weeks and a long winter vacation reaching through the period of heavy snows and deep mud. In many towns this long vacation can be considerably reduced.

Again, if districts like Franconia, New Ipswich, Brentwood, Hampstead, Newington, Stratham, and Farmington

(town), can maintain thirty-six weeks, it is difficult to see why weather and geographical conditions should prevent any district from maintaining at least thirty weeks.

The plea that the financial burden on many country towns will not permit a longer year has a better foundation in fact, and is discussed at length in connection with the equalization problem.

#### SUMMARY.

At least 94 per cent. of all the children in the state between the ages of five and sixteen are enroled in the public schools.

The percentage of children within the compulsory school age, eight to fourteen, who are not regularly attending school, including all absent on account of physical disability and other legal causes, is within 1 per cent.

The elimination of schools of less than twelve pupils, by consolidation, has of late been rapidly increasing.

The grading of schools has been rapidly increasing. Fifty-three per cent. of all schools are now graded, enrolling a much larger percentage of the total membership than this.

*A tendency of abandoned schoolhouses to open and fill up with newcomers has been noted.*

Percentage of attendance is now nearly at a maximum.

Attendance in high schools and academies is increasing at the rate of 10.7 per year.

A constantly increasing proportion of pupils are remaining in school long enough to complete the entire course through the high school or academy.

Fifty-six per cent. of all pupils in the state are in districts maintaining thirty-six weeks of school or over.

#### CAUSES.

In turning to seek the causes of this general and steady improvement along the lines of attendance and lengthened

schooling, it is natural to refer to the legislative enactments which were calculated to produce these results. The most important among these have been those enumerated below.

I. 1881. Establishment of the Department of Public Instruction on its present basis. The department has served both as a unifying and as a stimulating force throughout the entire period with a constantly widening range of activity.

II. 1885. Abolishment of the district system. The elimination of the very small schools has chiefly been due to this act, although it has taken a long time for the people to become accustomed to the changed conditions. The act also unlocked a large aggregate of school money, which remained in the treasuries of legal but dormant districts, and served as a powerful agency in breaking down the narrowing effect of extreme localism.

III. 1889. The free text-book act. The inevitable effect of this act in encouraging attendance and regularity and lengthening the term of years during which the individual pupil could attend school is too obvious to require comment.

IV. 1899. The equalization and supervisory law. Although the effect of this act has been primarily upon quality rather than upon quantity of schooling, the increased revenue of a large number of towns has lengthened the school year, and the employment of more continuous oversight in supervision has improved both attendance and regularity.

V. 1901. The high school act of 1901 has been effective both in the notable increase of the proportion of children availing themselves of high school education, and in the stimulation of existing schools to better adapt themselves to the needs of the immediate constituency.

The attendance and child labor law of 1901 may be viewed as the final act putting us in full command of our



problem of attendance, so that the same may now be looked upon practically as solved.

All these causes working together have probably afforded such a stimulus to the quality of schoolroom work as to make a force for betterment, much beyond the aggregate of their individual effects. Mention should also be made of the period of accepted popular valuation, as it might be called, of the State Normal school, and its better adaptation to its purpose, which began at about 1900; and of the powerful stimulus afforded by the new regime at Dartmouth College, dating from 1893,—both of these being contributory rather than direct causes.

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## CHAPTER II.

### THE WORK OF THE SCHOOLROOM—ELEMENTARY SCHOOLS.

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By the term elementary school is meant that portion of the course of instruction next preceding the high school or academy. It includes both graded and ungraded schools and the whole range from the beginning of school life to, and including, the last year below the high school. The term does not include the kindergarten.

In estimating the work of pupil and teacher upon the studies and exercises of the schoolroom, it is impossible to arrive at any such definite conclusions as those presented in the last chapter. In the first place, in the absence of any inspecting system, the state superintendent can only draw inferences from the character of the work in such schools as he has seen, believing the latter to be typical of their classes. In the second place, it is difficult to speak with assurance of progress for the reason that what knowledge is of most worth to one generation is apt to be all but unknown to preceding generations.



It is often stated that our schools are inferior to the schools of former days, because children do not know so much. The statement is worthless in any case because no living person has access to data which would justify any such positive generalization, either one way or the other. The schoolmasters and governing boards who preceded us left scarcely a scrap from which we can learn what they taught, how they taught, or what or how thoroughly the pupils learned.

Analysis of the assertion to which reference has just been made usually discloses that the person making the statement has a conception of useful knowledge entirely different from that which guides the modern teacher, and furthermore he is almost always found to be comparing intellectual giants of the past generations with the average pupil of to-day. For instance, he asserts that his son knows no geography because the latter cannot compete with his father in giving the names of the capitals of all the states or a list of the capes on the coast of Africa, it may be. If asked to compete with his son as to knowledge of the why and the wherefore of winds and water supply, of great population centers, of trade routes, etc., he would at once reply that they didn't teach such stuff when he went to school. What knowledge is of the most worth?

Again, the father is proud of accuracy as a speller, provided he is not put to the test, and of his past ability to parse English sentences at the drop of the handkerchief. He avers that the son is poorly schooled, because he cannot do what the father thinks he can. But the boy loves good reading, knows a host of the great names of literature, can enjoy something else than the newspaper, and can express himself in tolerably good English. And so on—with arithmetic where the father is very likely right, with history which father committed to memory, with the study of the human body which father "never had." Again, what knowledge is of the most worth?

And so it is idle to assert that in quality the best elementary schools of the state are either better or worse as a class than they were last year, or the last decade, or the last generation. Nobody knows.

What is their condition to-day is to some extent another question. Even upon this point we can do little better than guess our way along, for lack of adequate, impartial, scientific inspection of all local systems.

In connection with other duties during the past two years, I have visited in the vicinity of two hundred different elementary schoolrooms, observing the condition of buildings, outhouses, schoolrooms and sanitariums, the attitude and spirit of the children, the subjects taught, the methods of the teacher, and in a large number of instances, I have tested the children's attainments. These schools have ranged from what seem to me to have been the best, to what seemed the worst elementary school I have ever seen. The schools were of all types, city, village, and rural, graded and ungraded, supervised and unsupervised, under normal graduates and under persons ignorant not only of teaching but of the subjects taught.

I should divide the towns represented, as to excellence of school work, into two classes. The first class would contain all these schools in which an effort seemed to be made by the teacher to stimulate pupils to think, with, of course, varying degrees of success. The second class would include those schools in which the teacher appeared to have no conception whatever of his or her office, merely mills for grinding out memorized recitations, schools in which if the pupil grows at all in power to think he does so in spite of the school rather than with the help of the school. The remark of one teacher as I left his school is significant of the attitude of these teachers as a class. Said he, "They would be all right if they would get down to study." It seemed not to have occurred to him that it was in any way a part of his duty to make them "get down to study."

Of course, a dividing line cannot be drawn so that it can be said that schools of the first class all occur in certain towns and schools of the second class in certain other towns. Occasionally, there will be found in a town, the rest of whose schools are of the second type, a school which is well up among the better class of schools; and, *per contra*, it is not unheard of to find an utterly incompetent teacher holding on in an otherwise good local system. But generally speaking, schools are of about the same quality within the same town.

Schools and towns of the second class may be dismissed from further discussion from the standpoint of this chapter. As to schoolroom work, there is little in them worthy of the name of teaching or study.

*Towns of the first class.* I estimate that perhaps as much as 60 per cent. of the enrolment of the state is in towns of this class. The class would comprise all the cities, practically all the towns having considerable village communities, and a good many strictly rural towns. Some of the poorest rural towns of the state are easily in this class, and, on the other hand, some of the richest towns are easily in the second class.

*Excellencies of schoolroom work in towns of this class. Its broadening and refining influence.* In most of these towns reading is taught in such a way as to give to the pupil the power to read the thought from the printed page, a rare accomplishment with adults. This once done, it becomes increasingly easy, especially in a state so bountifully supplied with public libraries, to arm the pupil with the love of good reading, one of his best future safeguards. This is the aim of the state and local programs of study, and the record of children's use of the public libraries shows that it is taking effect.

Again, to a greater or less extent, music and drawing are being made parts of the regular round of work in these schools. The broadening and refining influence of

these studies is well known and the effect can hardly fail to be a pronounced uplift of the public taste in the next generation.

The character of the school buildings and schoolrooms is constantly improving. Twenty-one new buildings were erected within the two years covered by this report, and many others remodeled. The new buildings are almost uniformly erected with an eye to architectural beauty as well as hygienic excellence, with a commendable degree of success. The interiors of the schoolrooms are usually decorated by the teachers themselves or by pupils, with results, often crude it is true, but a marked improvement over the squalid neglect formerly so widely prevalent and still so prevalent in towns of the other class. A tasteful schoolroom can hardly fail to exercise an influence upon the home of the future and in the direction of enhanced sweetness and refinement in the character of the coming generation.

The school management in the elementary schools of towns of this class is almost universally good. I have been profoundly impressed in towns of this class with the extreme scarcity of evidences of turbulence among the pupils, and of contentious, fretful dispositions among the teachers. The well-nigh universal rule seems to have been good will between pupils and teachers. In this connection, it is interesting and significant to note the disappearing hostility of children to schools. Whereas a generation ago the boy who was fond of school was a sort of monstrosity, to-day there seems to be very little pronounced dislike of school. All this must make for an increasing ability of the neighbors of the future to get on well together.

*Development of thinking power.* Subjects such as history and geography, particularly, I find to be taught with a constantly increasing emphasis upon an understanding of the facts presented as distinguished from mere memory of such facts. Vast improvement still needs to be made in

this direction, but in this better class of towns improvement seems to be steady.

Reading as an implement for thought-getting rather than purely for recitative purposes I have touched upon.

The study of nature in a partially systematic manner I find in one or another form in the great majority of schools in towns of this class. Closely allied with this is the study of the human body, as prescribed by the statutes, constantly improving in point of rational conception.

*Inception of handwork.* Distinct progress has been made in the two-year period in the extent to which training in the use of the hands forms a factor in the elementary program. Such forms as basketry and raffia, paper cutting, pasteboard, and clay modeling are carried on in a large number of the towns of this class, precisely how large a number I am unable to say. In Manchester, Concord, Berlin, Plymouth, Portsmouth and Lebanon complete courses in manual training in the elementary schools are in operation during the current fall term of 1908. In Concord and in Berlin, the elementary manual training forms the basis of a complete high school course in mechanic arts.

In scattered instances in both the cities and the rural towns school gardening is carried on, although with difficulty owing to unfavorable relation of the summer vacation to the growing season.

*Criticisms of the schoolroom work in towns of the better class.* Perhaps the most fundamental criticism which my observation leads me to make is the serious lack of thoroughness in schools of this sort.

In all which makes for lively imagination, quick perception, superficial understanding, they are in most cases very good. In all which requires accurate and enduring knowledge, schools even in towns of the better class are almost universally weak. Under stress of recitation and the stimulus of a lively interest in all which is going on about him, the pupil is often superb. When required to



sit down in the schoolroom, or in the counting room, or in the home, and disclose what he actually knows, particularly in subjects like mathematics, he is often a pitiful failure.

Superficially, the cause which I have most often noted is the tendency of teachers, who ought to know better, to do little beyond presentation of their subjects, and that too often in an incoherent manner. The pupil is not held rigorously to accountability for his side of the task.

Fundamentally, the trouble is governmental and will not be corrected until the cause is eliminated. The teacher is seldom herself held to a rigid accountability for real results. If her class is 90 per cent. unable to stand any real test, it is seldom of any consequence so long as she is popular. Her pupils are handed on through the system and the system as a whole, and the high school in particular, incontinently blamed when the first test of life discloses their incapacity to the employer. If a conscientious superintendent recommends the dismissal of this teacher, his recommendation is apt to be deemed biased or unreasonable by the board, and, if supported by the board, superintendent and board alike are assailed by petitions from worthy and even prominent citizens demanding the teacher's restoration. The petitioners have known her to be a worthy lady these many years, and also know that the pupils love her, forgetting that amiability and ability to teach school are not necessarily synonymous terms. If the board persists, another election is apt to see a new board in place. Furthermore, the teacher who holds her pupils up to scholarship and tells parents the truth about their poor work is seldom popular with either pupils or parents.

What wonder then, if it has become so widely the custom for teachers to emphasize that part of instruction which pleases, to the avoidance of that part which requires stern application; if superintendents prefer to praise the interest

and liveliness of pupils and not to look too closely when the day of promotion arrives? What wonder if professional educators so roundly denounce all tests, and men of affairs hold modern schools in contempt?

If the people like the present irresponsibility of teaching, which is undeniably a comfortable way of getting on, the people need not complain at the poor scholarship of their children.

When every teacher knows that she must deliver at the end of the year a group of children who know what she has taught them, be it much or little, know it accurately and permanently,—when she knows that she must produce such definite and estimable results or else that her place will know her no more, and that she cannot plead amiability as an offset, then and not till then will the public be gratified with the kind of scholarship which it desires.

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### CHAPTER III.

#### THE WORK OF THE SCHOOLROOM—SECONDARY SCHOOLS.

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It is possible to report upon the work of the secondary schools with far greater completeness and assurance than upon that of the elementary schools, for the reason that the standard of each of the former is annually a subject of investigation by this department. The records on file at this office show exactly what has been done in every subject, in every year, in every curriculum, in every approved high school or academy in the state. It will be observed that this record extends only to *quantity*, and does not assume to include *quality*, except so far as the latter is inherent in quantity and in a force of instructors of guaranteed educational equipment.



The teaching force of all four-year high schools and academies in the state is college bred, or the full equivalent for the purposes of the position held. As a matter of fact, out of 323 regular teachers in the approved high schools and academies for last year, 286 held collegiate degrees, and others were properly trained for their work. For instance, six modern language teachers who were not college graduates, had been trained in Europe.

Every such school followed in good faith a course of study approved by this department as fully complying with the requirements of chapter 96, Laws of 1901. Of course, not all schools taught the same subjects.

#### ENGLISH LANGUAGE AND LITERATURE. .

##### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in English are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

TABLE No. 23.

	ENGLISH I.				ENGLISH II.				ENGLISH III.				ENGLISH IV.			
	No. pupils failed.		No. thems.		No. pupils passed.		No. thems.		No. pupils failed.		No. thems.		No. pupils passed.		No. thems.	
	Classics		Classics		Classics		Classics		Classics		Classics		Classics		Classics	
	In class.	Outside reading.	In class.	Outside reading.	In class.	Outside reading.	In class.	Outside reading.	In class.	Outside reading.	In class.	Outside reading.	In class.	Outside reading.	In class.	Outside reading.
Alton.....	6	6	6	6	6	6	6	6	7	3	30	4	4	0	30	4
Amherst 2.....	2	6	1	0	0	6	18	8	7	0	18	9	5	...	...	...
Antrim.....	3	0	4	15	0	18	0	0	7	0	6	6	1	...	...	...
Atkinson.....	10	12	3	0	1	0	9	0	7	0	15	4	6	17	0	10
Austin-Cate.....	6	0	30	4	6	12	0	20	3	0	15	4	6	4	22	0
Berlin.....	42	5	25	5	4	28	3	25	27	4	18	7	4	6	30	6
Berkeley.....	9	0	36	5	9	7	0	38	1	1	40	8	6	0	10	7
Bristol 2.....	6	0	36	5	6	3	0	36	6	6	6	6	6	6	0	10
Bristol 2.....	6	0	36	5	6	3	0	36	6	6	6	6	6	6	0	10
Clarendon.....	34	13	180	5	6	31	2	60	33	4	40	7	6	23	0	36
Coe's, Northwood.....	9	0	95	5	4	6	0	6	12	0	60	6	6	...	...	...
Coly.....	15	4	d	*	4	24	0	108	25	0	*	3	3	25	0	12
Colebrook.....	30	1	30	5	6	12	1	30	6	12	0	30	6	16	0	30
Concord.....	119	21	*	2	0	76	4	32	7	0	61	5	38	55	4	19
Concord, St. Mary's.....	5	0	68	3	8	6	0	36	5	3	0	68	7	5	2	0
Dover.....	88	3	36	6	5	33	1	36	5	5	5	5	5	50	2	15
Dover.....	3	40	2	0	1	2	0	*	6	1	10	3	0	9	1	12
Epping 3.....	5	1	25	3	1	6	0	40	3	0	25	6	*	4	0	26
Exeter 5.....	22	1	60	4	5	11	1	30	15	3	0	6	3	9	0	16
Farmington.....	19	3	16	6	6	13	0	16	9	1	16	6	6	9	0	16
Franklin 5.....	19	1	45	6	6	28	8	36	23	0	60	6	6	15	0	36
Gilmanston.....	4	2	20	6	6	5	1	20	6	1	0	60	6	4	0	42
Goffstown.....	14	2	40	6	1	9	2	36	8	0	35	8	2	7	0	25
Gorham.....	12	1	25	6	0	9	9	35	6	0	40	6	0	6	0	40

5-year program.

5-year program.

Hampstead.....	6	1	30	3	6	6	10	4	6	2	3	0	10	5	6
Hampton.....	7	15	0	0	12	8	15	5	0	2	7	3	0	15	8
Hanover 5.....	13	8	2	2	9	12	10	5	5	5	8	4	0	17	1
Haverhill.....	9	3	60	3	6	7	40	2	4	3	36	4	0	4	6
Henniker.....	9	1	25	5	2	0	20	6	4	3	0	10	6	6	4
Hillsborough.....	10	5	36	7	3	8	0	36	6	3	0	36	9	5	5
Hinsdale.....	9	0	30	5	2	2	0	25	5	3	8	0	25	5	4
Holderness 5.....	9	0	13	*	1	9	1	28	2	6	15	1	10	1	30
Hopkinton.....	11	0	35	5	6	8	0	36	6	6	15	1	30	7	6
Keene.....	66	9	35	7	2	65	2	35	10	2	36	11	2	37	0
Kimball Union.....	25	2	30	5	0	18	1	30	5	0	23	2	0	14	0
Laconia.....	43	10	50	6	6	32	5	48	8	6	33	5	50	5	6
Lancaster.....	27	2	36	6	6	21	2	36	6	6	14	1	72	6	6
Lebanon.....	22	2	53	4	6	25	2	100	4	6	17	0	43	6	6
Lisbon.....	9	1	36	7	6	8	1	36	7	6	4	1	36	6	6
Littleton 5.....	27	4	36	6	6	27	5	35	5	6	14	3	18	7	6
Manchester.....	153	12	18	4	6	105	18	18	5	6	105	4	38	6	6
Manchester, St. Anselm S.....	19	5	70	4	4	9	1	30	4	4	11	0	30	4	4
Marietta.....	7	0	20	5	1	11	1	35	5	0	5	0	15	7	3
Marlborough.....	10	0	30	5	6	6	0	25	7	6	6	6	0	36	6
Meridith 2.....	15	0	36	6	6	9	0	36	6	6	26	0	54	6	6
McGaw.....	15	1	72	6	6	38	1	54	6	6	14	0	10	16	0
Milford.....	25	1	*	3	1	7	1	3	9	10	60	6	18	9	0
Milton.....	16	0	*	3	1	7	1	3	9	10	60	6	18	9	0
Nashua.....	84	13	36	6	3	91	0	18	7	0	1	0	20	5	0
New Boston.....	6	0	40	6	0	2	0	20	5	0	16	0	30	5	0
New Hampton.....	17	0	75	2	0	15	0	75	6	4	1	15	6	7	4
New Ipswich.....	9	4	70	8	5	4	0	15	6	3	6	0	10	7	3
Newmarket 5.....	10	2	20	4	7	15	0	18	5	2	17	0	15	5	6
Newport.....	16	0	22	4	6	6	7	0	10	6	15	0	9	5	6
Pembroke.....	16	0	40	6	6	7	0	10	6	15	0	9	5	6	7
Penacook.....	14	3	8	0	3	0	12	0	13	5	0	1	15	8	0
Peterborough.....	17	3	40	*	9	19	0	40	6	6	12	0	40	8	*
Pinkerton.....	34	3	80	4	5	30	0	80	6	6	22	2	100	6	1
Pittsfield.....	14	5	72	3	3	5	3	36	5	3	9	0	18	8	2
Plymouth.....	31	40	5	6	16	5	7	40	7	6	17	2	40	0	40
Portsmouth.....	76	17	42	6	56	10	47	8	6	6	36	7	47	8	6
Proctor.....	18	3	30	6	6	11	0	30	6	6	10	0	30	6	6
Rollisford.....	25	6	126	4	6	21	0	126	5	6	22	1	90	4	6
Robinson.....	53	2	36	6	6	37	3	40	5	6	26	0	4	10	35
Rochester 5.....	19	5	1	0	5	19	3	20	5	5	16	1	20	6	6
Sauborn.....	23	10	25	3	7	6	15	1	30	6	12	0	40	6	6
Somersworth.....	13	0	36	3	0	18	0	18	6	6	12	0	50	6	6
Stratford.....	41	3	35	7	*	43	3	38	8	1	52	4	40	1	25
Tilton.....	10	0	50	4	8										*
Troy 1.....	10	0	50	4	8										*



The designation, "number of themes," refers to the approximate frequency of themes. For instance, a school reporting thirty-six themes in a given year expects weekly themes, usually brief ones; one reporting eighteen themes, calls for them bi-weekly, and so on. It is probable that both the average and the number of themes in the majority of schools are too great. One short theme once in two weeks properly corrected and studied, is better than one every week half corrected, and far better than one every day. The latter is often the best way of cultivating the use of slovenly English.

Theme writing represents but one side of the study of the practical use of the mother tongue. It is further studied in the use of manuals of grammar and rhetoric as follows:

Twenty-three schools report the study of a manual of rhetoric in each of four years.

Twenty-two schools report the study of a manual of rhetoric in each of three years.

Seventeen schools report the study of a manual of rhetoric in each of two years.

The following do not report the study of a manual in any year, although it appears that they for the most part had full instruction in connection with theme writing:

Amherst‡, Farmington, Newmarket, Gorham‡, Hinsdale‡.

In thirty-nine schools, in addition to the reading of classics, the writing of themes and study of rhetoric, the history of English literature is studied in one or more years.

The standard in these matters proposed by the Program of Studies for Secondary Schools is study of manuals of grammar and rhetoric for the first three years, followed by the study of a suitable brief history of the literature of the English language. The reading of English classics contemplates (a) the classroom study of several standard pieces of literature; and (b) the outside

reading by individual pupils, largely at their own selection, of several other classics, with report to the teacher sufficient to show that the works have actually been read.

*The purposes of English study in the secondary school.*

The legitimate and practicable purpose and scope of the study of English in the secondary school are herewith summarized.

I. Teaching pupils to speak and write the language correctly, clearly, and with some degree of force. The secondary school continues the work of the elementary school, at present with very little advance in purpose and in general with very little advance in results. So far as the observation of the writer goes, what is chiefly needed is:

1. Genuine insistence that pupils upon entering the secondary school shall do as well as they know; at present, the teacher is apt to assume that they know nothing, and set the instruction back to the level of the primary school.

2. A clear conception in the instructor's mind of the purpose of instruction at a grade somewhat in advance of that of the elementary school.

3. Clear, concise, definite, persistent instruction in both the knowledge and the use of the mother tongue continued during at least the first three years, with practice in the fourth year somewhat relaxed; such instruction in the majority of our secondary schools is incoherent, diffuse, based upon text-books which might well be said to be suffering from fatty degeneration, albeit marked improvement in this respect has been noted during the past year.

II. The reading of the English classics for the purpose of (1) learning how to read literature, (2) developing a taste for good reading, and (3) enjoying and growing in grace from the reading of good literature as schooling goes on.

The first of these purposes has been recognized for years in the work of our schools, and the others are being better



and more rationally recognized every year in both elementary and secondary schools. The chief need is teachers with a genuine love for and appreciation of good literature. Without these qualities, little is to be gained by exhortations addressed to the teaching force. We are securing a better proportion of such teachers, year by year.

III. At the end of the twelve years of acquaintanceship with the mother tongue and its literature, a rounding up in the shape of a course in the history of literature is believed to be eminently desirable.

I am able to report that instruction in English in our secondary schools as a class has very distinctly improved within the last two years. The year 1906 is to be taken as the date of the acceptance of English as being of as much importance as any subject. Prior to that, Latin held undisputed sway in our programs, and English was relegated to what was left in teaching time and teaching ability. In that year, the department refused to approve any high school or academy which would not give at least as much time to English as to that subject receiving the greatest time allowance. The effect seems to have been immediate and pronounced, although it will take years to yield its full return. No other subject whatever is of so much importance to the individual as a good understanding of the mother tongue and its literature, no other is of more educational value when well taught, no other is more a distinguishing mark of the educated man.

## LATIN LANGUAGE AND LITERATURE.

### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in Latin Language and Literature are here given.



\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

Fab. Fac.=Fabulæ Facilis.

V. R.=Viri Romæ.

Latin I.

Latin II-IV.

1=Pupils passed and failed. 1=Pupils passed and failed.

2=Beginner's book.

2=Prose composition.

3=Other Latin.

3=Sight reading.

4=Latin read.

TABLE No. 24.

	LATIN I.	LATIN II.	LATIN III.	LATIN IV.	LATIN V.
Alton .....	1. 9-11. 2. Bb. 3. 0.	1. 1-0. 2. * 3. 15 pp. 4. 4 Caesar.	1. 7-0. 2. * 3. 0 4. 7 Orations. Some Ovid.	1. 3-0. 2. * 3. 0. 4. 6 Virgil.	
Antrim .....	1. 5-0. 2. Bb. 3. 18 ch. Caesar. 30 pp. Fab. Fac.	1. 5-0. 2. * 3. 40 pp. 4. 4 Caesar. 900 Ovid.	1. 3-0. 2. * 3. 50 pp. 4. 7 Orations. Caesar V. VIII Sel.		
† Atkinson .....	1. 6-2. 2. Bb. (-). 3. 0.	1. 2-0. 2. * 3. 0 4. 3 Caesar.		1. 2-0. 2. * 3. 0. 4. 6 Virgil.	
Austin-Cate .....	1. 6-0. 2. Bb. 3. Sel. stories.	1. 12-0. 2. * 3. * 4. 4 Caesar.	1. 10-1. 2. * 3. * 4. 7 Orations.		
Berlin .....	1. 12-3. 2. Bb. 3. 26 ch. Caesar.	1. 15-0. 2. * 3. 10 pp. 4. 4 Caesar. 3 Orations.	1. 6-0. 2. * 3. 0. 4. 5½ Orations. 1500 Ovid.	1. 7-0. 2. * 3. 0. 4. 6 Virgil.	
Bethlehem .....	1. 4-1. 2. Bb. 3. 25 pp. reader.	1. 5-0. 2. * 3. 20 pp. 4. 4 Caesar.		1. 2-0. 2. * 3. 100 ll. 4. 6 Virgil. + 300 ll.	
Bristol 2. ....	1. 6-0. 2. Bb. 3. 15 pp. V. R.	1. 3-0. 2. * 3. 5 pp. Caesar. 200 Ovid. 4. 4 Caesar.			

TABLE No. 24.—*Continued.*

	LATIN I.	LATIN II.	LATIN III.	LATIN IV.	LATIN V.
Claremont.....	1. 18-0. 2. Bb. 3. Sel. from Caesar II.	1. 12-1. 2. * 3. 15 pp. 4. 4 Caesar.	1. 10-1. 2. * 3. 15 pp. 4. 7 Oration.	1. 7-0. 2. * 3. 250 ll. 4. 18 pp. 5. 7 Oration.	
Coe's.....	1. 8-1. 2. Bb. (-). 3. 0.	1. 3-0. 2. * 3. 12 pp. 4. 108 pp. 2d year Latin.	1. 8-0. 2. * 3. 200 ll. 4. 6 Virgil. 5. 500 Ovid.		
Colby.....	1. 11-2. 2. Bb. 3. 15 Lessons. 4. Reader.	1. 5-1. 2. * 3. 0. 4. 4 Caesar.	1. 7-1. 2. * 3. 0. 4. 7 Oration. 5. 1000 Ovid.	1. 5-0. 2. 0. 3. 200 ll. 4. 6 Virgil.	
Colebrook.....	1. 10-8. 2. Bb. 3. 0.	1. 5-1. 2. * 3. 75 pp. 4. 4 Caesar. 5. 400 ll. Virgil.	1. 10-0. 2. * 3. 75 pp. Cicero. 4. 7 Oration.		
Concord.....	1. 53-17. 2. Bb. 3. 48 pp. V. R.	1. 41-1. 2. * 3. 25 per cent. of 4. 4. 4 Caesar. 5. 500 Ovid.	1. 23-0. 2. * 3. 33 $\frac{1}{3}$ per cent. of 4. 4. 4 Oration. 5. 1500 Ovid.	1. 11-1. 2. * 3. 33 $\frac{1}{3}$ per cent. of 4. 4. 2 Oration. 5. 1500 Ovid. 6. 33 Virgil.	
St. Mary's.....	1. 2-0. 2. Bb. 3. 68 Fab. Fac. 4. 14 ch. Caesar.	1. 3-2. 2. * 3. 20 pp. 4. 4 Caesar. 5. 40 Stories Via Lat.		1. 2-0. 2. * 3. 1500 ll. 4. 25 pp. 5. 8 Oration. 6. 2000 Ovid. [ters. 7. Sel. Cicero's Let-	1. 15-0. 2. * 3. 10 pp. 200 ll. 4. 6 Virgil.
Dover.....	1. 49-0. 2. Bb. 3. 0.	1. 22-2. 2. * 3. 15 pp. 4. 4 Caesar.	1. 23-0. 2. * 3. 15 pp. 4. 7 Oration. 5. 1000 Ovid.		

† Dow .....	1. 4-2. 2. Bb. 3. 0.	1. 0-4. 2. * 3. 0. 4. 3 Caesar.	1. 2-0. 2. * 3. 0. 4. 7 Orations.	.....
Epping 5 .....	1. 5-1. 2. Bb. 3. 0. 4. 41 ch. Caesar.	1. * 2. 10 pp. 3. 0. 4. 4 Caesar.	1. 3-0. 2. * 3. 0. 4. 779 Ovid.	.....
Exeter 3 .....	1. 18-5. 2. Bb. 3. 10 ch. Caesar.	1. 8-0. 2. * 3. 0. 4. 4 Caesar.	1. 7-1. 2. * 3. 0. 4. 7 Orations.	.....
Farmington .....	1. .... 2. Bb. 3. 0.	1. 13-0. 2. 0. 3. 10 pp. 2d year Latin. 4. 15-4.	1. * 2. .... 3. 100 ll. 4. 4 Virgil.	1. 5-0. 2. * 3. 650 ll. 10 pp. 4. 6 Virgil.
Franklin 5 .....	1. 12-2. 2. Bb. 3. 6 pp. Caesar.	1. * 2. 1½ Caesar. 3. 2 Nepos. 4. 100 Ovid.	1. 11-1. 2. * 3. 10 pp. 4. 1 Nepos.	1. 9-1. 2. * 3. 20 pp. 4. Letters Sel.
Gilmanton .....	.....	.....	1. 12-0. 2. * 3. 30 ll. 5 pp. 4. 6 Virgil. 1420 Ovid. 2 Nepos.	.....
† Goffstown .....	1. 6-3. 2. Bb. 3. 0.	1. 8-2. 2. * 3. 0. 4. 4 Caesar.	1. 4-1. 2. * 3. 100 Ovid. 4. 4 Orations.	1. 5-0. 2. * 3. 0. 4. 6 Virgil.
† Gorham .....	1. 4-2. 2. * 3. 1 ch. Caesar.	1. * 2. 4-0. 3. 50 pp. 4. 4 Caesar.	1. * 2. 4-0. 3. 0. 4. 500 Ovid.	1. 2-0. 2. * 3. 500 ll. 4. 1 Oration. 5 Virgil. 1200 Ovid.

TABLE No. 24.—*Continued.*

	LATIN I.	LATIN II.	LATIN III.	LATIN IV.	LATIN V.
† Hampstead.....	1. 4-2. 2. Bb. (-). 3. 0.	1. 6-0. 2. * 3. 50 pp. 4. 5 Caesar. 600 Ovid. 12 pp. Nepos.	1. 2-0. 2. * 3. 10 pp. 4. 9 Orations.	.....	.....
Hampton .....	1. 5-1. 2. Bb. 3. 16 ch. Caesar.	1. 7-0. 2. * 3. 4 pp. 4. 4½ Caesar.	1. 2-0. 2. * 3. 8 pp. 4. 2 Caesar. 4 Orations.	1. 6-0. 2. * 3. 100 ll. 4. 4 Orations. 3 Virgil.	.....
Hanover 5.....	1. 11-2. 2. Bb. 3. 0.	1. 7-2. 2. * 3. 0. 4. Introd. to Caesar. 30 ch. Caesar. Caesar II and III, as in 2d yr. Latin.	1. 5-0. 2. * 3. 0. 4. 1 Caesar. 2 Orations.	1. 6-0. 2. * 3. 400 ll. 4. 1500 Ovid. 3 Virgil.	.....
† Haverhill .....	1. 6-0. 2. Bb. 3. 0.	1. 5-0. 2. * 3. 25 pp. 4. 4 Caesar.	.....	1. 4-0. 2. 0. 3. 0. 4. 6 Virgil. 1500 Ovid.	.....
Henniker.....	1. 3-0. 2. Bb. (-). 3. 0.	1. 2-0. 2. * 3. * 4. 4 Caesar.	.....	1. 4-0. 2. * 3. 0. 4. 6 Virgil.	.....
Hillsborough .....	1. 7-5. 2. Bb. 3. 4 ch. Caesar.	1. 9-0. 2. * 3. 15 pp. 4. 4 Caesar.	1. 2-0. 2. * 3. 500 ll. 4. 6 Virgil.	1. 2-0. 2. * 3. 25 pp. 1000 ll. 4. 8 Orations. 450 ll. Virgil. 600 Ovid.	.....

† Hinsdale.....	1. 8 1. 2. Bb. 3. 0.	1. 2 0. 2. * 3. 0 4. 4 Caesar.	1. 3 0. 2. * 3. 0. 4. 6 Orations.	1. 3-0. 2. * 3. 0. 4. 6 Virgil.
Holderness 5.....	1. 7-1. 2. Bb. 3. 15 ch. Caesar.	1. * 2. 22 pp. 3. 4 4. 4 Caesar.	1. 11-0. 2. * 3. 500 ll. 4. 1500 Ovid.	1. 6-0. 2. * 3. 30 pp. 4. 7 Orations. 2 Virgil.
Hopkinton.....	1. 2 0. 2. Bb. 3. 0.	1. 1-0. 2. * 3. 0. 4. 4 Caesar.	1. 1-0. 2. * 3. 0. 4. 6 Virgil.	1. 8-0. 2. * 3. * 4. 6 Virgil.
Keene.....	1. 31 9. 2. Bb. 3. 0.	1. 38-1. 2. * 3. 25 pp. 4. 4 Caesar.	1. 9-1. 2. * 3. 25 pp. 4. 7 Orations. 600 Ovid.	1. 5-0. 2. 0. 3. 500 ll. 4. 6 Virgil.
Kimball Union.....	1. 18-4. 2. Bb. 3. 0.	1. 8 3. 2. * 3. 10 pp. 4. 4 Caesar.	1. 11-0. 2. * 3. 8 pp. 60 ll. 4. 6 Orations. 1000 Ovid.	1. 13-0. 2. * 3. * 4. 1500 Ovid. 6 Virgil. 2 Orations.
Laconia.....	1. 36 5. 2. Bb. 3. 28 pp. Fab. Fac.	1. 14-0. 2. * 3. 12 pp. 4. 4 <sup>1</sup> / <sub>2</sub> Caesar. 1 Virgil.	1. 14-0. 2. * 3. * 4. 6 Orations. 1500 Ovid.	1. 4-0. 2. * 3. 20 pp. Ovid. 4. 6 Virgil.
Lancaster.....	1. 14 2. 2. Bb. 3. V. R.	1. 12-1. 2. * 3. 25 pp. 4. 4 Caesar.	1. 7-0. 2. * 3. 25 pp. 4. 6 Orations. Sallust de Cat.	
Lebanon.....	1. 9 2. 2. Bb. 3. Reader.	1. 9-2. 2. * 3. 30 pp. 4. 4 Caesar. 100 ll. Virgil.	1. 3-2. 2. * 3. 25 pp. 500 ll. 4. 7 Orations. 1800 Ovid.	

TABLE No. 24.—*Continued.*

	LATIN I.	LATIN II.	LATIN III.	LATIN IV.	LATIN V.
Lisbon .....	1. 7-3. 2. Bb. 3. 0.	1. 5-0. 2. 20 pp. 3. 5 Caesar.	1. 3-0. 2. * 3. 1 Oration. 4. 7 Orations.	.....	
Littleton 5.....	1. 23-3. 2. Bb. (-) 3. 12 Gradatim.	1. 16-0. 2. * 3. 29 pp. 4. Bb. Gradatim. 15 ch. Caesar.	1. 11-0. 2. * 3. 25 pp. 4. 4 Caesar. + 9 Ch. 350 Ovid.	1. 10-0. 2. * 3. 300 ll. 4. 6 Virgil. 350 Ovid.	1. 1-0. 2. * 3. 300 ll. 4. 6 Virgil. 350 Ovid.
Manchester.....	1. 132-17. 2. Bb. 3. Fab. Fac. 19 ch. Caesar.	1. 54-17. 2. * 3. 60 pp. I, III, IV. 4. Cat. I. +	1. 33-2. 2. * 3. 60 pp. 300 ll. 4. 5 Orations. 840 Ovid.	1. 28-1. 2. * 3. 1300 ll. 30 pp. 4. Æneid IV, V, VI 3 Orations. 1000 Ovid.	
St. Anselm's .....	1. 14-3. 2. Bb. 3. Fables. Roman Hist.	1. 6-1. 2. * 3. 100 pp. 4. 4 Caesar.	1. 9-3. 2. * 3. 100 pp. 4. 6 Orations.	1. 5-3. 2. * 3. 3000 ll. 4. 6 Virgil.	
† Marlborough.....	1. 5-2. 2. Bb. partially. 3. 0.	1. 4-0. 2. Partial. 3. 15 pp. 4. 4 Caesar.	1. 4-0. 2. * 3. 10 pp. 4. 6 Orations.	.....	
Meredith 2.....	1. 10-0. 2. Bb. 3. V. R. Fab. Fac.	1. 6-0. 2. * 3. 30 pp. 4. 4 + Caesar.	1. 6-0. 2. * 3. 4 + Caesar.		
McGaw .....	1. 8-1. 2. Bb. 3. 7 ch. Caesar.	1. 4-0. 2. * 3. 25 pp. 4. 4 + Caesar.	1. 1-1. 2. * 3. 5. Virgil.	.....	



Milford.....	1. 14-3. 2. Bb. 3. 13 ch. Caesar.	1. 17-1. 2. * 3. 15 pp. 4. 4 + Caesar.	1. 9-0. 2. * 3. 30 pp. 4. 7 Orations. 400 ll. Æneid.	1. 8-1. 2. * 3. 1000 ll. 4. 6 Æneid. 1575 Ovid.
Milton .....	1. 11-0. 2. Bb. 3. 2 Nepos. 4. 22 ch. Caesar.	1. 11-0. 2. * 3. 5 pp. 100 ll. 4. 5 ch. Cicero.	1. 11-0. 2. * 3. 5 pp. 4. 9 Orations. 500 Ovid.	1. 8-0. 2. * 3. 5 pp. 4. 500 Ovid.
Nashua ...	1. 39-2. 2. Bb. 3. 2 Bks. Eutropius Fab. Fac. V. R.	1. 38-3. 2. * 3. 25 pp. 4. 4 Caesar. 3 Nepos.	1. 24-3. 2. * 3. * 4. 3 Æneid. 3 + Orations.	1. 11-0. 2. * 3. * 4. 6 Æneid. 300 Ovid.
+ New Boston.....	1. 2-0. 2. Bb. 3. 0.	1. 2-0. 2. * 3. 5 Virgil.	1. 2-0. 2. * 3. 0. 4. 6 Orations.	1. 2-0. 2. * 3. 0. 4. 6 Orations. 1431 Ovid.
New Hampton .....	1. 16-0. 2. Bb. 3. 5 ch. Caesar.	1. 5-0. 2. * 3. 0. 4. 4 Caesar.	1. 4-0. 2. * 3. 0. 4. 6 Orations.	1. 2-0. 2. * 3. 0. 4. 6 Æneid. 1500 Ovid.
New Ipswich.....	1. 1-1. 2. Bb. 3. 0.	1. 3-0. 2. * 3. 0. 4. 4 Caesar. 300 Ovid.	1. 3-0. 2. Bb. 3. 0. 4. 9 ch. Caesar.	1. 4-0. 2. * 3. 30 pp. 4. 2 Cicero. 4 Virgil.
Newmarket 5.....	1. 10-1. 2. Bb. 3. 0.	1. 3-0. 2. Bb. 3. 0. 4. 9 ch. Caesar.	1. 6-0. 2. 0. 3. 15 pp. 4. 4 Caesar.	1. 9-1. 2. 0. 3. 1 Caesar. 4. 5 Cicero.
Newport.....	1. 6-0. 2. Bb. 3. 10 ch. Caesar.	1. 9-0. 2. * 3. 30 pp. 4. 4 Caesar. 9 ch. Cicero.	1. 10-0. 2. * 3. 35 pp. 200 ll. 4. 7 Orations. 1125 Ovid.	1. 2-0. 2. * 3. 200 ll. 4. 6 Virgil.

TABLE No. 24.—*Continued.*

	LATIN I.	LATIN II.	LATIN III.	LATIN IV.	LATIN V.
Pembroke .....	1. 10-0. 2. Bb. 3. 22 pp. "Easy Latin."	1. 8-0. 2. * 3. 20 ch. Caesar.	1. 4-0. 2. * 3. 1 Oration, 7 Orations.	.....	
Penacook .....	1. 5-1. 2. Bb. 3. 0.	1. 8-2. 2. * 3. 20 pp. 4. 4 Caesar (-).	1. 5-0. 2. * 3. 300 ll. 4. 5 Æneid.	1. 4-0. 2. 0. 3. 300 ll. 4. 1 Caesar, 5 Æneid.	
Peterborough .....	1. 10-3. 2. Bb. 3. 20 ch. Caesar.	1. 3-0. 2. * 3. 22 pp. 4. 5 Caesar.	1. 4-0. 2. * 3. 14 pp. 4. 7 Orations (+).	.....	
Pinkerton .....	1. 19-7. 2. Bb. 3. 0.	1. 15-1. 2. * 3. 4 Caesar.	1. 7-1. 2. * 3. 20 pp. 4. 8 Orations.	1. 6-1. 2. * 3. 0. 4. 6 Æneid. 950 Ovid.	
Pittsfield .....	1. 10-1. 2. Bb. 3. 0.	1. 4-0. 2. * 3. 20 pp. 4. 4 Caesar.	1. 4-1. 2. * 3. 12 pp. 4. 7 Orations, 500 Ovid.	1. 4-1. 2. * 3. 20 pp. 100 ll. 4. 6 Æneid.	
Plymouth .....	1. 19-1. 2. Bb. 3. 2 Caesar.	1. 13-0. 2. 146 pp. Pearson. 3. 75 pp. 4. 5 Caesar (+).	1. 11-1. 2. * 3. 20 pp. 4. 8 Orations, 1500 Ovid.	1. 6-0. 2. * 3. 0. 4. 6 Æneid.	
Portsmouth .....	1. 29-12. 2. Bb. 3. Gradatim.	1. 19-6. 2. 50 pp. Jones. 3. 20 pp. Daniell. 4. 80 pp. 5. 4 Caesar (+).	1. 16-2. 2. Daniell II. 3. 50 pp. 4. 7 Orations, 2500 Ovid.	1. 10-1. [Pract. 2. 92 pp. Daniell's 3. 25 per cent. of 4. 4. 6 Æneid. 441 Ovid.	

Proctor .....	1. 6-2. 2. Bb. 3. 0.	1. 1-3. 2. * 3. 25 pp. 4. 4 Caesar.	1. 7-1. 2. * 3. 40 pp. 4. 4 Caesar. 3 Orations.	1. 5-0. 2. * 3. 30 pp. 1000 ll. 4. 6 Virgil. 1000 Ovid.
Robinson .....	1. 23-5. 2. Bb. 3. 0.	1. 24-1. 2. 20 pp. D'Ooge. 3. 35 pp. 4. 1000 Ovid. 1 Caesar (-).	1. 8-0. 2. 40 D'Ooge II, III. 3. 30 pp. 4. 4 Virgil. 2 Orations.	1. 8-0. 2. * 3. 40 pp. 4. 4 Virgil. 3 Orations. 30 ch. Sallust.
Rochester 5 .....	1. 35-7. 2. Bb. 3. 0.	1. 17-5. 2. * 3. 0. 4. 4 Caesar (-).	1. 7-0. 2. * 3. 50 pp. 150 ll. 4. 6 Orations. 500 Ovid.	1. 18-0. 2. * 3. 40 pp. 4. 6 Virgil.
Sunborn .....	1. 18-3. 2. Bb. 3. 3 Caesar.	1. 12-1. 2. * 3. * 4. 4 Caesar (+).	1. 6-0. 2. * 3. 90 pp. 4. 7 Orations. Sel. Letters Cic.	1. 5-0. 2. * 3. 50 per cent. of 4. 4. 6 Virgil. 1500 Ovid.
Somersworth .....	1. 17-1. 2. Bb. 3. Fab. Fac.	1. 10-1. 2. * 3. 40 pp. 4. 4 Caesar (+).	1. 5-0. 2. * 3. 30 pp. 100 ll. 4. 6 Orations. 600 ll.	1. 8-0. 2. Jones—all. 3. 500 ll. 4. 6 Virgil.
Stratford ....	1. 4-1. 2. Bb. 3. 2 ch. Caesar.	1. 10-0. 2. * 3. 10 pp. 4. 4 Caesar.	.....	1. 4-0. 2. * 3. 10 pp. 4. 7 Orations.
Tilton .....	1. 41-10. 2. Bb. 3. 20 ch. Caesar.	1. * 2. * 3. * 4. 4 Caesar (+).	1. 10-1. 2. * 3. * 4. 6 Orations.	1. 13-0. 2. * 3. * 4. 6 Virgil (+). 1200 Ovid.

TABLE No. 24.—*Continued.*

	LATIN I.	LATIN II.	LATIN III.	LATIN IV.	LATIN V.
Troy 1.....	1. 4-0. 2. Bb. 3. 0.				
† Walpole.....	1. 7-0. 2. Bb. 3. 0.	1. 2-0. 2. 0. 3. 50 pp. 4. 4 Caesar.	1. 2-0. 2. 23 Sect. Dodge & Tuttle. 3. 20 pp. 4. 6 Oration.	1. 1-0. (Tuttle. 2. 23 Sect. Dodge & Tuttle. 3. 0. 4. 4 Oration. 1900 ll.	
† Warner.....	1. 5-0. 2. Bb. 6. 3. 0.	1. 5-0. 2. 25 ch. Gunnison & Haley. 3. 25 pp. 4. 4 Caesar.	1. 6-0. 2. 25 ch. Moulton. 3. 0. 4. *		
Whitefield.....	1. 10-0. 2. Bb. (-). 3. 0.	1. 10-0. 2. * 3. 11 pp. 4. 4 Caesar.	1. 6-0. 2. * 3. 20 pp. 4. 7 Oration. 15 pp. Sallust.		
Wilton.....	1. 5-2. 2. Bb. 3. Gate to Caesar.	1. 8-0. 2. * 3. 0. 4. 4 Caesar (+).	1. 1-0. 2. * 3. 10 pp. 4. 7 Oration. 2 Caesar.	1. 1-0. 2. * 3. 600 ll. 4. 6 Virgil. 500 Ovid.	
Winchester.....	1. 10-2. 2. Bb. 3. 10 ch. Gate to Caesar.	1. 6-0. 2. * 3. 25 per cent. of 4. 4. 4 Caesar.	1. 3-0. 2. * 3. 10 per cent. of 4. 4. 7 Oration. 454 Ovid.		
Woodsville.....	1. 14-2. 2. Bb. 3. 30 pp. Stories.	1. 10-1. 2. 56 lsn. Pearson. 3. 20 pp. 4. 4 Caesar.	1. 5-0. 2. 44 lsn. Pearson. 3. 10 pp. 4. 7 Oration. 200 ll.		

## DISCUSSION OF LATIN RECORD.

	No. pupils.	No. passed.	No. failed.	Average percent. failed.
Latin I.....	1,218	1,028	190	16
Latin II.....	721	650	71	10
Latin III.....	578	553	25	4
Latin IV-V.....	346	335	11	3

## STANDARD REQUIREMENTS.

Latin I. Beginner's book complete and some extra easy reading. Sixty per cent. fully met this requirement. Thirty per cent. were slightly, but not seriously, short. Ten per cent. were admonished.

Latin II. Four books of Gallic War, with constant practice in sight reading and prose composition. Eighty-four per cent. of the schools having classes fully met, and in many cases exceeded, this requirement. Three per cent. fell under admonition for work of this year, and ten per cent. were slightly, but not seriously, below standard.

Latin III and IV. Standard: Seven Orations of Cicero, fifteen hundred lines of Ovid, six books of Virgil's Aeneid, with constant practice in sight translation and prose composition. Owing to the fact that the work of these courses extends over two years, it is impossible to state exactly the percentage meeting the standard in any one year. It can be said, however, that not less than seventy-five per cent. of all having classes in these courses fully met the standard. Of the remainder, many of them are still struggling with the heritage of poorly prepared classes, which began high school life during the period in which the program of any given school might, and often did, change with every change in the principalship.

The Latin standard outlined in the document entitled a Standard Program of Studies for the Secondary Schools of New Hampshire, contemplates *power* to read

Latin with some degree of facility as well as a specified amount of ground covered. While our secondary schools doubtless read more Latin every year, and that with greater ease, they are still far from developing in pupils the power to read even ordinary Latin without lexicon at elbow. It may be doubted whether it is worth the while allowing four years of five periods per week to the study unless it can show more than the meager results of increased power in the individual now manifest.

### GREEK LANGUAGE AND LITERATURE.

#### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in Greek Language and Literature are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

#### Greek I.

1=Pupils passed and failed.

2=Beginner's book.

3=Other Greek.

#### Greek II—III.

1=Pupils passed and failed.

2=Prose composition.

3=Sight reading.

4=Greek read.

TABLE No. 25.

	GREEK I.	GREEK II.	GREEK III.
Claremont...	.....	.....	1. 1-1. 2. Gleason, 30 pp. Higley, 25 pp. 3. 0. 4. 3 Iliad. Rev. Anab.
Colby .....	1. 1-1. 2. Bb. 3. 0.	1. 2-0. 2. * 3. 20 pp. 200 ll. 4. 4 Anabasis. 3 Iliad.	1. 1-0. 2. 0. 3. 0. 4. 3 Iliad.
Concord.....	1. 10-0. 2. Bb. [rus. 3. 24 ch. Story of Cy-	1. 5-0. 2. 23 ch. Jones. 3. Anab. IV-V. 4. 4 Anabasis.	1. 3-0. 2. 14 ch. Jones. 3. 0. 4. 6 Iliad. 1 Odyssey. 3 ch. Anab.
Dover.....	.....	1. 7-0. [plete. 2. Woodruff com- 3. 35 pp. 4. 4 Anab.	.....
Franklin 5...	.....	.....	1. 4-0. 2. * 3. 900 ll. 4. 1 Anab. 3 Iliad (+). 3 Odyssey (+).
Holderness 5.	1. .... 2. Bb. 3. 0.	1. 5-0. 2. ½ Collar. 3. 10 pp. 4. 4 Anab.	1. 1-0. 2. ½ Collar. 3. 600 ll. 4. 3 Iliad. 4 Anab.
Keene.....	1. 4-0. 2. Bb. 3. 0.	.....	.....
Kimball Union	1. 2-0. 2. Bb. 3. 6 pp. Anab.	1. 6-0. 2. * 3. 15 pp. 4. 3 Anab. (+).	1. 1-0. 2. 0. 3. 0. 4. 3 Iliad.
Laconia.....	1. 11-0. 2. Bb. 3. Anab. I. 6 pp. sight.	.....	.....
Manchester..	1. 16-0. 2. Bb. 3. 20 pp. Anab.	1. 4-4. 2. Woodruff (-). 3. Daily. 4. 4 Anab. 30 pp. Herodotus.	1. 7-0. 2. 20 lsn. Higley. 3. 1600 ll. Odyssey. 4. 6 Iliad.
St. Anselm's.	1. 6-2. 2. 70 White. 3. Kægi's Ex. Bk. I.	1. 8-2. 2. White complete. Kægi II. 3. 90 pp. Anab. 4. 3 Anab.	1. 2-1. 2. Kægi II. 3. 1500 ll. 4. 3 Iliad.



TABLE No. 25.—*Continued.*

	GREEK I.	GREEK II.	GREEK III.
New Hampton	1. 1-0. 2. Bb. 3. Sel. Anab.	.....	1. 1-0. 2. 30 lsn. Pearson. 3. 0. 4. 4 Iliad.
New Ipswich	1. 2-0. 2. Bb. 3. 1 Anab.	.....	.....
Newport.....	.....	1. 2-0. 2. * 3. 15 pp. 4. 4 Anab.	1. 1-0. 2. * 3. 150 ll. 4. 6 Iliad.
Pembroke....	.....	1. 2-0. 2. * 3. * 4. 1 Anab. (+).	.....
Pinkerton....	1. 2-0. 2. Bb. 3. Anab.	1. 2-0. 2. * 3. Anab. IV. 4. 4 Anab.	.....
Plymouth....	1. 1-0. 2. Bb. 3. 8 ch. Anab.	.....	1. 2-0. 2. * 3. Daily. 4. 4 Iliad. 1 Odyssey.
Portsmouth..	1. 3-0. 2. Bb. 3. 154 pp. Anab. 98 pp. Gk. comp.	.....	.....
Proctor.....	.....	.....	1. 6-0. [entire. 2. Collar & Daniell 3. ½ Anab. 500 ll. 4. 2 Anab. 3 Iliad.
Robinson ....	1. 3-0. 2. Bb. 3. Anab.	.....	.....
Sanborn .....	.....	.....	1. 2-0. 2. * 3. 300 ll. 10 pp. 4. 6 Iliad. 5 Lysias.
Tilton.....	1. 2-0. 2. Bb. 3. Anab.	1. 2-0. 2. * 3. 40 pp. 4. 4 Anab.	.....

## DISCUSSION.

	No. pupils.	No. passed.	No. failed.	Average per cent. failed.
Greek I.....	67	64	3	4
Greek II.....	51	45	6	12
Greek III.....	34	32	2	6

## STANDARD REQUIREMENTS.

Greek I. Beginner's Book, Easy Reading, Anabasis begun, Greek prose composition last half of spring term.

Greek II. Anabasis, four books, complete; Greek prose composition; selections from other Greek.

Greek III. Iliad I-III, or equivalent from Homeric poems; Greek prose composition; prosody.

## FRENCH LANGUAGE AND LITERATURE.

## ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in French Language and Literature are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

a=Indicates that work designated at head of column has been done in the school in course so marked.

TABLE No. 26.

	FRENCH I.					FRENCH II.					FRENCH III.						
	No. passed.	No. failed.	Beginners' book.	Sight reading, pp.	French read, pp.	No. passed.	No. failed.	Grammar.	Prose composition.	Sight reading, pp.	French read, pp.	No. passed.	No. failed.	Grammar.	Prose composition.	Sight reading, pp.	French read, pp.
Alton	1	0	a	0	50	10	0	a	a	50	350	4	0	a	a	50	550
‡ Amherst 2	3	2	a	10	200	1	0	a	a	10	50						
Antrim	10	0	a	20	300	7	0	a	a	100	728						
Atkinson						5	0	a	a	*	539						
Austin-Cate	12	0	a	30	60	3	0	a	a	150	752	17	0		See II.		
Berlin	23	10	a	8	71	27	4	a	a	104	531	22	0	a	a	45	404
Bethlehem	6	0	a	40	157	2	0	a	a	50	611	6	0	a	a	40	363
Bristol 2	3	0	a	50	200												
Coe's	6	0	a	10	100	11	1	a	a	50	395			a	a	50	645
Colby	14	3	a	0	110	10	1	a	a	50	673						
Colebrook	11	1	a		140	19	0	a	a	100	350			See II.			
Concord	70	6	a	20	120	51	4	a	a	60	310	14	1	a	a	125	525
Dover	28	8	a	25	200	21	0	a	a	100	524	15	1	a	a	100	636
Dow	2	1	a	50	340												
Epping 5	7	1	a	4	32	2	0	a	a	25	296	3	0	a	a	50	547
Exeter 3	4	0	a	20	102	11	0	a	a	40	311						
Farmington	14	0	a	10	140	9	0	a	a	12	300	8	0	a	a	30	539
Franklin 5	21	3	a	30	329	13	2	a	a	75	499	5	0	a	a	120	1290
Gilmanton						4	1	a	a	90	361						
‡ Goffstown	7	4	a	0	100	6	1	a	a	100	*	7	0	a	0	100	*
‡ Gorham	4	0	a	50	100	12	0	a	0		400						
Hampstead	4	0	a	75	300	2	0	a	a	100	450						
Hampton	11	3	a	67	200	4	0	a	a	150	654	9	0	a	a	75	594
Hanover 5	7	4	a	10	150	8	1	a	a	50	380	7	1	a	a	75	845
† Haverhill	5	1	a	15	50	4	0	a	a	10	210	4	0	a	a	15	300
Hillsborough	8	0	a	10	100	4	0	a	a	40	525						
Holderness 5	12	1	a	50		4	0	a	a	75	275	4	0	a	a	150	500
Hopkinton	18	2	a	20	87	4	0	a	a	35	314						
Keene	39	13	a	50		33		a	a	75	500	10	0	a	a	*	500
Kimball Union	14	5	a	10	160	12	1	a	a	20	365						
Laconia	55	5	a	150	350							28	0	a	a	200	700
Lancaster	18	2	a	20	150	20	1	a	a	40	400	10	0	a	a	*	750
Lebanon	11	3	a	125	319	4	0	a	a	275	687						
Lisbon	7	4	a	20	357	4	2	a	a	50	580	2	0	a	a	25	418
Littleton 5	16	2	a	50	242	19	0	a	a	100	366	9	0	a	a	200	671
Manchester	75	10	a	100	200	66	0	a	a	50	400	39	0	a	a	50	900
Marlborough	11	1	a	30	198	6	0	a	a	60	460	15	0	a	a	50	487
Meredith 2	6	0	a	50	200												
McGaw	9	0	a	25	265	4	1	a	a	25	306						
Milford	29	6	a	130	300	27	6	a	a	150	470	15	1	a	a	175	636
Nashua	80	10	a	30	145	75	4	a	a	100	275	27	0	a	a	100	438
† New Boston	3	0	a	37	84	6	0	a	a	0	200						
New Ipswich	7	0	a	25	250												
Newmarket 5	6	0	a	25	200	13	0	a	a	50	333	7	0	a	a	40	376
Newport	16	1	a	96	240	15	0	a	a	130	575						
Pembroke	10	0	a	35	116	12	0	a	a	100	512						
Penacook	14	2	a	20	320	7	4	a	0	10	292						
Peterborough	8	3	a	100	333	10	2	a	a	100	352	10	0	a	a	262	787
Pinkerton	30	2	a	0	75	24	0	a	a	*	333	8	0	a	a	300	614
Pittsfield	9	1	a	30	200	8	1	a	a	75	525						
Plymouth	14	2	a	50	90	13	2	a	a	100	552	9	0	a	a	150	675
Portsmouth	29	12	a	40	*	27	0	a	a	100	656	10	0	a	a	250	703
Proctor	8	0	a	50	100	11	1	a	a	75	452	2	0	a	a	150	680
Robinson	22	2	a	25	230	22	1	a	a	50	340						
Rochester 5	27	7	a	25	182	8	1	a	a	145	354	17	0	a	a	150	527
Sanborn	19	4	a	30	150	13	0	a	a	200	493	4	0	a	a	200	540
Somersworth	7	2	a	40	204	14	2	a	a	30	238	13	0	a	a	45	636
Stratford	17	0	a	20	150	3	0	a	a	40	580	4	0		See II.		
Tilton	50	7	a	40	255	43	3	a	a	150	322	21	1	a	a	150	481
† Walpole	10	0	a	0	13	2	0	a	a	200	760						
† Warner	20	5	a	5	30	9	1	a	a	25	309						
Whitefield	11	2	a	15	81	8	0	a	a	12	350	10	0	a	a	35	352
Wilton	9	0	a	15	130	4	0	a	a	50	333	3	0	a	a	100	636
Winchester	7	1	a	10	*	9	0	a	a	40	460	1	0	a	a	75	446
Woodsville	22	1	a	100	300	5	0	a	a	160	470	7	0	a	a	150	550

## GERMAN LANGUAGE AND LITERATURE.

## ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in German Language and Literature are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numerals following name of school shows number of years in its course. When no numeral is given, four is to be understood.

a=Indicates that work designated at head of column has been done in the school and course so marked.



[illegible]

## SUMMARY—FRENCH

	FRENCH I.					FRENCH II.					FRENCH III.				
	No. passed.	No. failed.	Beginners' book.	Sight reading, pp.	Literature read, pp.	No. passed.	No. failed.	Grammar.	Prose composition.	Sight reading, pp.	Literature read, pp.	No. passed.	No. failed.	Grammar.	Prose composition.
Totals.....	1066	165	13	37	176	810	48	6	78	430	532	5	1	110	588
Percentage of failures.....															
Averages.....															

## SUMMARY—GERMAN.

	GERMAN I.					GERMAN II.					GERMAN III.				
	No. passed.	No. failed.	Beginners' book.	Sight reading, pp.	Literature read, pp.	No. passed.	No. failed.	Grammar.	Prose composition.	Sight reading, pp.	Literature read, pp.	No. passed.	No. failed.	Grammar.	Prose composition.
Totals.....	336	15	4	41	186	202	9	4	101	379	44	2	4	103	448
Percentage of failures.....															
Averages.....															

## FRENCH AND GERMAN—DISCUSSION.

These are the only modern foreign languages taught in our secondary schools. French was offered in nearly all schools having a program of more than one year, and German in addition to French in about one-half the schools.

## STANDARDS.

Study of grammar, prose composition, and drill upon inflected forms throughout the several courses in each lan-



guage. In addition the reading of the literature of the languages as follows:

French I—125 to 200 duodecimo pages of standard works.

German I—75 to 100 duodecimo pages of standard works.

French II—300 to 500 duodecimo pages of standard works.

German II—150 to 200 duodecimo pages of standard works.

French III—500 to 700 duodecimo pages of standard works.

German III—400 to 450 duodecimo pages of standard works.

The average standard maintained in this last respect was higher than that prescribed, and in German particularly, it is evident that this standard generally recognized by college authorities is somewhat lower than what the schools can readily do. Here, as in other studies, a mere quantitative standard is not an accurate measure of the quality of the work. There can, however, be no quality without quantity, and the prescription of a minimum ground to be covered is perhaps the best practical means now at hand to insure a standard of work. While comparison between schools cannot be pushed too closely, it is in general true that the school which has covered the most ground has done the best work. Particularly in the languages, a good amount of reading is the best assurance that the school has succeeded in some degree in imparting the power to read the literature of the language studied.

As at present handled, there is practically no possibility of teaching pupils to speak either French or German in our secondary schools. To do so would require control of the pupil's out-of-school life to such an extent that a large proportion of his regular conversation would be in the language taught. The proper aim of our schools is and should be to develop in the pupil the power to read French

or German works readily and with pleasure, without depending upon a lexicon. This aim is coming nearer to entire achievement by an increasing number of schools every year.

Several schools report that they use "the conversational method" or "French (or German) the language of the classroom." Such reports are not in most cases to be taken seriously, for although the instructor uses the foreign tongue more or less in speaking to the class, and pupils understand more or less what is said, it would be the wildest stretch of the imagination to call such intercourse conversation. In nearly every case, the method really used is grammatical and form study and drill, the learning of vocabularies, and increasing power of pupils to read the language without entire dependence upon the lexicon.

## ALGEBRA.

### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in algebra are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

†=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

1=Pupils passed and failed.

2=Text used.

3=Work covered.

TABLE No. 28.

	ALGEBRA I.	ALGEBRA II.	REVIEW.
Alton .....	1. 16-4. 2. Wells. 3. To radicals (+).		1. 4-0. 2. Went. El. 3. Entire.
‡ Amherst 2...	1. 2-2. 2. Wells. 3. To quadratics.	1. 1-0. 2. Wells. [coeff. 3. To undetermined	
Antrim .....	1. 10-0. 2. Durell & Robbins. 3. Thro' radicals (+).		1. 4-0. 2. Durell & Robbins. 3. Thro' binomial.
† Atkinson....	1. 9-1. 2. Wells. 3. To simultaneous equations.		1. 3-0. 2. Wells Ess. 3. Entire.
Austin-Cate..	1. 6-0. 2. Wentw'th H. Sch. 3. Thro' quadratics.		1. 17-0. 2. Went. H. Sch. 3. Thro' bin. theor.
Berlin .....	1. 37-13. 2. Wells Ess. 3. Thro' radicals.		1. 22-0. 2. Milne. 3. Thro' progress'ns.
Bethlehem...	1. 8-1. 2. Went. 3. Thro' quad. (—).		1. 6-0. 2. Went. 3. Thro' quadratics.
Bristol 2.....	1. 6-0. 2. Schultze El. 3. To quadratics.		
Claremont....	1. 45-6. 2. Wells Ess. 3. Thro' quadratics.		1. 16-0. 2. Beman & Smith. 3. Coll. requirem't.
Coe's.....	1. 8-1. 2. Brad. & Emery. 3. Thro' quadratics.		1. 6-0. 2. B. & E. 3. As I.
Colby .....	1. 21-4. 2. Went. El. 3. Ch. I-XVIII.	1. 9-1. 2. Went. New Sch. 3. Ch. XVIII-XXVI.	1. 12-2. 2. Wells New Higher 3. Ch. XX-XXXV.
Colebrook....	1. 26-10. 2. Went. New Sch. 3. To Imag.	.....	1. 11-0. 2. Milne. 3. Entire.
Concord.....	1. 98-43. 2. Wells Ess. 3. To quadratics (+).		1. 19-3. 2. Wells College. 3. To logarithms.
St. Mary's....	1. 4-0. 2. Wells. 3. Thro' fractions.	1. 3-0. 2. Wells. 3. Thro' bin. theor.	1. 1-0. 2. McCurdy. 3. Coll. requirem'ts.
Dover .....	1. 85-7. 2. Wells Ess. 3. Thro' quadratics.		1. 31-2. 2. Went. New Sch. 3. Thro' bin. theor.
Dow .....	1. 5-4. 2. Wells. 3. Thro' quadratics.		1. 0-2. 2. Wells Acad. 3. Entire.

TABLE No. 28.—*Continued.*

	ALGEBRA I.	ALGEBRA II.	REVIEW.
Epping 5.....	1. 6-1. 2. Durell & Robbins. 3. To quadratics (+).	1. 6-1. 2. Went. 3. Thro' progress'ns	
Exeter 3.....	1. 17-6. 2. Went. New Sch. 3. To quadratics (-).		
Farmington ..	1. 19-3. 2. Wells Ess. 3. Thro' quad. (-).		1. 3-0. 2. Wells Ess. 3. Thro' progress'ns.
Franklin 5....	1. 15-5. 2. Went. & Hill. 3. *	1. 27-10. 2. Went. New Sch. 3. Pp. 74-316.	1. 16-0. 2. Schultze Adv. 3. Pp. 114-363.
Gilmanton....	1. 2-4. 2. Wells Acad. 3. Thro' quadratics.		1. 4-0. 2. Wells Acad. 3. Entire.
‡ Goffstown...	1. 13-3. 2. Went. New Sch. 3. To quadratics.		1. 10-0. 2. Went. El. 3. To cube root.
† Gorham .....	1. 7-2. 2. Went. 3. *		
Hampstead...	1. 2-5. 2. Went. New Sch. 3. Ch. I-XI.		
Hampton.....	1. 11-7. 2. Lippincott's El. 3. Entire.		1. 7-0. 2. Lippincott. 3. Entire.
Hanover 5.....	1. 17-3. 2. Slaught & Lennes. 3. Entire (-).	1. 9-1. 2. Wells Ess. 3. Thro' quad.	1. 9-1. 2. Wells Ess. 3. Thro' bin. theor.
Haverhill. ...	1. 6-7. 2. Went. New Sch. 3. Thro' quad. (-).	1. 6-2. 2. Went. New Sch. 3. Complete.	1. 6-2. 2. Went. New Sch. 3. *
Henniker.....	1. 9-1. 2. Went. 3. Thro' quadratics.		
Hillsborough.	1. 9-4. 2. Went. El. 3. To simul. eq.	1. 1-0. 2. Went. El. 3. Thro' bin. theor.	1. 6-1. 2. Went. New Sch. 3. To logarithms.
Hinsdale .....	1. 9-0. 2. Went. 3. Thro' simul. eq.	1. 2-0. 2. Went. 3. Thro' quad.	1. 10-1. 2. Went. El. 3. Entire.
Holderness 5..	1. 8-2. 2. Went. 3. To simul. eq.	1. 11-1. 2. Went. 3. Thro' bin. theor.	1. 7-1. 2. Wells Adv. 3. As in II.
Hopkinton....	1. 10-0. 2. Wells Ess. 3. Thro' quadratics.		1. 3-0. 2. Wells Acad. 3. Thro' bin. theor.

TABLE No. 28.—*Continued.*

	ALGEBRA I.	ALGEBRA II.	REVIEW.
Keene.....	1. 63-17. 2. Milne. 3. Thro' quad. (+).		1. 12-0. 2. Schultze. 3. Coll. requirem'ts.
Kimball Union	1. 20-3. 2. Wells. 3. To quadratics.		.....
Laconia.....	1. 40-4. 2. Wells Ess. 3. Thro' quad. (—).		1. 21-2. 2. McCurdy. 3. *
Lancaster.....	1. 26-4. 2. Wells Acad. 3. Pp. 1-255.	1. 6-1. 2. Wells New High'r. 3. Pp. 224-375.	1. 8-1. 2. Wells New High'r. 3. Pp. 1-375.
Lebanon.....	1. 22-5. 2. Wells Ess. 3. Thro' quad. (—).		1. 10-0. 2. Went. Coll. 3. Thro' bin. theor.
Lisbon .....	1. 7-4. 2. Went. New Sch. 3. Thro' radicals.		1. 4-0. 2. Went. New Sch. 3. Thro' log.
Littleton 5...	1. 26-7. 2. Went. First Steps. 3. To quadratics.	1. 17-6. 2. Wells Acad. 3. Thro' ratio & prop.	1. 12-0. 2. Wells Ess. 3. Thro' bin. theor.
Manchester...	1. 165-35. 2. Wells Ess. 3. To radicals.	1. 115-22. 2. Wells Ess. 3. Thro' quad.	1. 35-0. 2. Fisher & Schwatt. 3. To per. and com.
St. Anselm's..	1. 18-6. 2. Went. Comp. 3. To involution.	1. 10-2. 2. Went. Comp. 3. To progress'us.	1. 6-1. 2. Went. Comp. 3. To choice.
† Marlborough	1. 7-0. 2. Wells. 3. Thro' radicals.		1. 16-0. 2. Went. El. 3. Thro' simul. equa.
Meredith 2...	1. 9-1. 2. Atwood Gr. Sch. Went. New Sch. 3. To quadratics (+).		
McGaw .....	1. 15-0. 2. Went. New Sch. 3. Thro' quadratics.	.....	1. 2-0. 2. Went. New Sch. 3. Thro' bin. theor.
Milford .....	1. 17-9. 2. Wells Ess. 3. To quadratics.		1. 21-0. 2. Went. New Sch. 3. Thro' bin. theor.
Milton .....	1. 16-0. 2. Wells Ess. 3. Pp. 1-211.		1. 13-2. 2. Wells New High'r. 3. Pp. 1-339.
Nashua .....	1. 80 6. 2. Went. New Sch. 3. Thro' quadratics.		1. 16-1. 2. Wells Ess. 3. To undet. coeff.
New Boston..	1. 7-0. 2. Went. El. 3. To quadratics (+).		1. 1-0. 2. Went. El. 3. To quadratics.

TABLE No. 28.—*Continued.*

	ALGEBRA I.	ALGEBRA II.	REVIEW.
New Hampton	1. 16-0. 2. Went. New Sch. 3. Entire.		1. 7-0. 2. Went. New Sch. 3. Review of book.
New Ipswich	1. 10-3. 2. Went. New Sch. 3. Thro. quad. (—).		
Newmarket 5.	1. 14-2. 2. Went. New Sch. 3. Thro' quad.	1. ——— 2. ——— 3. Thro' progress'ns.	1. 4-0. 2. Wells. 3. To log. (+).
Newport .....	1. 7-3. 2. Slaught & Lennes 3. Thro' ra. & pro. (—)		1. 12-5. 2. Wells Ess. 3. Thro' bin. theor.
Pembroke ...	1. 12-4. 2. Went. New Sch. 3. To radicals.	1. 6-3. 2. Went. New Sch. 3. Complete.	1. 8-0. 2. Went. New Sch. 3. Thro' bin. theor.
Penacook .....	1. 12-5. 2. Wells Ess. 3. Thro' quadratics.		1. 8-8. 2. Wells Ess. 3. Thro' logarithms.
Peterborough.	1. 13-7. 2. Went. New Sch. 3. To ratio.		1. 10-0. 2. Went. New Sch. 3. To logarithms.
Pinkerton ....	1. 20-9. 2. Went. El. 3. To quadratics.	1. 17-3. 2. Went. El. 3. Complete.	1. 5-1. 2. Went. El. 3. Entire.
Pittsfield .....	1. 17-3. 2. Went. New Sch. 3. Thro' quad. (—).		1. 7-0. 2. Went. Comp. 3. Thro' bin. theor.
Plymouth .....	1. 41-6. 2. Wells Acad. 3. To ratio.		1. 13-1. 2. Milne. 3. To logarithms.
Portsmouth...	1. 78-13. 2. Taylor. 3. Thro' quadratics.		1. 22-2. 2. Wells Secondary. 3. Complete.
Proctor .....	1. 10-1. 2. Boyden. 3. Complete.		1. 6-0. 2. Went. Sch. 3. Complete.
Robinson .....	1. 35-3. 2. Somerville. [tions 3. Four fund. opera-	1. 27-5. 2. Went. El. 3. To quad. (—).	1. 6-0. 2. Went. El. 3. Coll. requirem'ts.
Rochester 5...	1. 52-6. 2. Milne. 3. Thro' quadratics.		1. 13-0. 2. Wells Higher. 3. Thro' bin. theor.
Sauborn .....	1. 18-5. 2. Went. New Sch. 3. To radicals.	1. 16-2. 2. Went. New Sch. 3. Thro' logarithms.	1. 6-0. 2. McCurdy. 3. Thro' progress'ns.
Somersworth.	1. 23-11. 2. Wells Algebra. 3. To surds.		1. 9-0. 2. Wells Higher. 3. To logarithms.

TABLE No. 28.—*Continued.*

	ALGEBRA I.	ALGEBRA II.	REVIEW.
Stratford.....	1. 15-2. 2. Went. Sch. 3. Thro' quad. (—).		1. 5-0. 2. Went. Sch. 3. Thro' quadratics.
Tilton .....	1. 43-9. 2. Schultze El. 3. Ch. 1-18.	1. 18-5. 2. Went. New Sch. 3. *	1. 16-2. 2. Robbins. 3. Thro' bin. theor.
Troy 1.....	1. 10-0. 2. Wells Ess. 3. To indet. equa.		
Walpole.....	1. 12-0. 2. Went. El. 3. Thro' quad.		1. 3-0. 2. Went. El. 3. Review. See I.
† Warner.....	1. 7-4. 2. Slang't & Lennes. 3. Thro' sim. equa.		1. 12-1. 2. Went. 3. To radicals.
Whitefield....	1. 8-6. 2. Wells Ess. 3. To radicals (+).	1. 7-0. 2. Wells Ess. 3. Thro' quad. (—).	1. 11-0. 2. Went. New Sch. 3. Thro' bin. theor.
Wilton.....	1. ——— 2. Wells. 3. To quad. (+).		.....
Winchester...	1. 12-1. 2. Went. El. 3. Thro' quad.		1. 6-0. 2. McCurdy. 3. Completed.
Woodsville...	1. 12-5. 2. Wells Ess. 3. Thro' ratio & pro.		1. 13-0. 2. Wells Ess. 3. Review as I.

## SUMMARY.

	No. passed.	Ave'ge No. percent. failed. failed.
Algebra I .....	1,320	271 17
Algebra II.....	278	54 19
Algebra III.....	532	35 6

## STANDARD.

Algebra I—To quadratics, including ratio and proportion and radicals.

Algebra II—Through quadratics, including radicals and equations involving radicals.

Algebra III—A review of the work done in I and II.



Course I is in every case a full year coming in the ninth grade or first secondary school year. Course II is usually one of a term or a semester in the second year of the secondary school. Twenty-one schools thus lengthened their preliminary work in algebra, forty-eight did not. Course III comes in either the third or the fourth year of the secondary school, and is in substance a review of the earlier work. It often includes progress beyond the ground covered in the earlier course or courses, the pupils being sufficiently mature for higher mathematical concepts.

Given Course I and Course III, the record shows that the second year course is of doubtful utility.

## PLANE GEOMETRY.

### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in geometry are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

a=Work all, or practically all, original.

e=Elementary course.

§=Euclid.

¶=To be completed in second course.

||=Third year.

TABLE No. 29.

	I.				II.				III.			
	Pupils passed.	Pupils failed.	Books covered.	No. originals.	Pupils passed.	Pupils failed.	Books covered.	No. originals.	Pupils passed.	Pupils failed.	Books covered.	No. originals.
Alton .....	1	0	5	400					4	0	*	100
Antrim .....	14	1	5	300					4	0	5	340
† Atkinson .....	2	1	4	280					3	0	5	300
Austin-Cate .....	12	0	5	200					17	0	a	400
Berlin .....	32	7	5	356					21	1	5	200
Bethlehem .....	5	1	5	400					6	0	5	407
Bristol 2 .....	3	0	5	400								
Claremont .....	27	8	5	275					16	0	5	321
Coe's .....	8	0	5	150					4	0	5	125
Colby .....	18	15	5	400	9	1	a	*	15	1	3	350
Colebrook .....	9	1	5	406					10	0	5	297
Concord .....	69	16	5	300					25	0	5	300
St. Mary's .....	2	0	a	a								
Dover .....	40	3	5	350					32	1	5	450
Dow .....	1	5	5	971					2	0	5	500
Epping 5 .....	3	0	5	483								
Exeter 3 .....	12	1	5	357								
Farmington .....	14	2	5	307					9	0	5	293
Franklin 5 .....	27	10	*	44	13	5	5	400	15	0	*	235
Gilmanston .....	4	2	5	420								
‡ Goffstown .....	8	3	4	300					10	0	3	50
† Gorham .....												
Hampstead .....	6	0	5	150								
Hampton .....	14	0	4	250					7	0	5	160
Hanover 5 .....	15	2	5	200					7	1	5	200
Haverhill .....	3	1	5	400								
Henniker .....	6	0	5	335								
Hillsborough .....	11	0	5	385					4	0	5	360
† Hinsdale .....									6	2	5	500
† Holderness 5 .....	8	0	5	125					2	0	5	75
Hopkinton .....	8	0	5	400								
Keene .....	69	9	5	330					12	0	5	250
Kimball Union .....	22	4	5	a								
† Laconia .....	30	10	5	100					16	0	a	a
Lancaster .....	26	3	5	402					8	0	5	100
Lebanon .....	13	2	5	378					10	0	5	240
Lisbon .....	4	5	5	460					1	0	*	*
Littleton 5 .....	26	7	e	e	17				12	0	5	279
Manchester .....	165	35	a	a	111	22	a	400	35	0	a	a
St. Anselm's .....	10	3	5	400								
† Marlborough .....	9	3	5	150					21	0	4	25
Meredith 2 .....	6	0	3	410								
McGaw .....	13	1	5	100					2	0	5	430
Milford .....	26	13	5	160					29	0	5	340
† Milton .....	10	0	5	125					8	0	5	50
Nashua .....	37	6	*	250					17	0	5	400
New Boston .....	3	0	5	200					6	0	5	350
New Hampton .....	12	0	5	600					7	0	See	l.
New Ipswich .....	7	1	5	400					2	2	See	l.
§ Newmarket 5 .....	13	0	1	100					8	0	6	500
† Newport .....	14	1	5	150					14	3	5	75
¶ Pembroke .....	14	0	3	100					2	0	5	125
† Penacook .....	12	2	5	100					8	0	5	66
Peterborough .....	7	4	5	285					10	0	5	475
Pinkerton .....	17	3	a	a					7	0	*	*
Pittsfield .....	7	1	5	250					7	0	5	*
Plymouth .....	14	3	5	440					13	3	a	a
Portsmouth .....	55	18	5	400					22	2	a	a

TABLE No. 29.—*Continued.*

	I.				II.				III.			
	Pupils passed.	Pupils failed.	Books covered.	No. originals.	Pupils passed.	Pupils failed.	Books covered.	No. originals.	Pupils passed.	Pupils failed.	Books covered.	No. originals.
Proctor .....	9	2	5	200	24	3	5	250	6	0	5	150
Robinson .....	34	4	e	e					6	0	*	160
† Rochester 5.....	34	7	4	150					10	0	4	260
Sanborn.....	13	0	5	500								
Somersworth .....	14	3	5	400								
Stratford .....	13	3	5	440								
Tilton .....	39	14	5	300					16	2	5	100
† Walpole.....	6	2	4	100					3	0	5	100
† Warner.....	11	2	4	300					12	0	4	*
Whitefield.....	6	7	5—	200					11	0	3	45
† Wilton .....	11	0	*	150								
Winchester.....	6	0	5	446					6	0	See	I.
Woodsville .....	13	3	5	456					13	0	5	100

## SUMMARY OF PLANE GEOMETRY.

Totals.....	1232	260			174	34			579	18	
Percentage of failures.....		17				17				3	
Averages .....			5	306			*	*			5 262

TABLE No. 29.—*Continued.*

## SOLID GEOMETRY.

	Pupils passed.	Pupils failed.	Books covered.	Number originals.
Claremont.....	2	1	4	75
Colby.....	7	0	3	150
Colebrook.....	6	0	3	162
Concord.....	6	1	4	100
Dover.....	11	0	3	120
Exeter 3.....	5	0	3	181
Farmington.....	1	0	3	117
Franklin 5.....	2	0	3	193
Hampton.....	7	0	3	60
Hanover 5.....	4	0	3	300
Haverhill.....	4	0	3	100
Holderness 5.....	8	0	3	60
Keene.....	4	0	3	*
Kimball Union.....	10	0	*	200
Laconia.....	13	0	3	150
Lisbon.....	4	0	3	260
Littleton 5.....	2	0	4	110
Manchester.....	25	2	*	*
St. Anselm's.....	4	3	3	160
Milford.....	13	0	3	125
Milton.....	8	0	4	50
New Hampton.....	8	0	4	*
Newport.....	7	0	4	25
Penacook ..	6	0	3	86
Pinkerton.....	2	0	*	*
Pittsfield.....	5	0	3	125
Plymouth.....	7	0	3	150
Portsmouth.....	8	0	4	170
Rochester 5.....	3	0	4	140
Sanborn.....	2	0	3	300
Somersworth.....	4	0	4	107
Tilton.....	6	1	3	100
Winchester.....	2	0	4	*

## SUMMARY OF SOLID GEOMETRY.

Totals.....	216	8		
Percentage failed.....		4		
Averages.....			3-4	118

Schools reporting three books of solid geometry used the text of Wentworth; those reporting four books, that of Wells.

## STANDARDS.

*Plane geometry.* Five books of plane geometry as set forth in the texts of Wentworth or Wells, or the equivalent,

with original exercises. While no precise extent has been demanded for the latter, except that a number of original exercises should be worked sufficient fully to illustrate the propositions of the text and give the pupil an adequate practice in independent geometrical thinking; the department has proposed four hundred of the various forms given in the texts named above as a suitable quantitative requirement. Forty-three per cent. of the schools completed 400 or over during the past year, and 60 per cent. completed 300 and upward, in addition to the propositions of the text. This is so decidedly a gain over the records of previous years, when some schools thought they could do none at all, and few schools accomplished enough to be of substantial value, that it seems proper to expect a school to give good and sufficient reasons for falling below this minimum in future years. Some schools, notably Manchester, St. Mary's, Kimball Union Academy, and Pinkerton, made practically the whole course in plane geometry one of original study.

*Solid geometry.* The texts of Wentworth or Wells or the equivalent complete, with 100 original exercises. This course usually extends over a term or at most a semester. All schools offering the course this year met the text requirements, and twenty-seven schools, or 82 per cent., met in full or exceeded the requirement for original work.

There has been some uncertainty whether or not pupils in the second year of the secondary school had sufficient maturity for the severely logical thinking of plane geometry.

It appears that the subject has been given first in the second year of all save five schools. The number of originals worked may be taken as a test of the relative ability of pupils in the two years to handle the work. It is unfortunate that a broader basis of comparison cannot be given. The schools giving plane geometry not before the third year were the following:

Name of school.	No. of originals reported.
Atkinson .....	280
St. Mary's.....	All work original.
Epping .....	483
Holderness .....	125
New Hampton (third and fourth) .....	All in book

Schools offering plane geometry in the third year of a five-year program:

Robinson Seminary .....	250
Franklin .....	400
Littleton .....	400

#### OTHER MATHEMATICS.

In addition to algebra, plane and solid geometry, other mathematical subjects were offered as follows:

Trigonometry.	Advanced Algebra.
Claremont.	Claremont.
Coe's.	Dover.
Colby.	Hanover.
Dover.	Portsmouth.
Hanover.	
Keene.	Advanced Arithmetic.
Littleton.	Austin-Cate.
Manchester (and surveying).	Dover.
New Hampton.	Epping.
Newport.	Gilmanton.
Penacook (and surveying).	St. Anselm's.
Pinkerton.	Marlborough.
Pittsfield.	New Boston.
Plymouth.	Pembroke.
Portsmouth.	Pittsfield.
Rochester.	Stratford.
Sanborn.	Whitefield.
Tilton.	Wilton.
Winchester.	Woodsville.

## PHYSICS AND CHEMISTRY.

## ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in Physics and Chemistry are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

†=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

H=Hoadley.

M&G=Millikan & Gale.

W&H=Wentworth & Hill.

C&C=Carhart & Chute.

Hg=Higgins.

G=Gage.

C=Culler.

H&B=Hall & Bergen.

C&D=Clarke & Dennis.

A=Avery.

H&S=Hessler & Smith.

S=Shepard.

P=Peters.

N=Newell.

R=Remsen.

M&A=McPherson & Anderson.

W=Williams.



TABLE No. 30.

	PHYSICS.					CHEMISTRY.				
	No. passed.	No. failed.	Text.	No. problems.	No. experiments.	No. passed.	No. failed.	Text.	No. problems.	No. experiments.
Alton.....	9	0	H	100	50					
Antrim.....	4	0	M & G	100	36					
Atkinson.....	4	0	W & H	*	40					
Austin-Cate.....	8	0	W & H	300	50	12	0	H & S	150	40
Berlin.....	51	6	H	200	37					
Bethlehem.....	3	1	H	100	50	4	0	S	50	50
Claremont.....	29	0	C & C	200	35	14	0	P	100	65
Coe's.....						7	0	H & S	150	48
Colby.....	15	2	M & G	175	40	15	2	N	50	300
Colebrook.....						16	1	H & S	75	125
Concord.....	38	5	W & H	200	60	22	2	N	150	90
Dover.....	40	0	W & H	200	65	9		H & S	50	48
Dow.....						3	1	N	50	63
Farmington.....	10	0	M & G	300	38	4	0	N	200	55
Franklin 5.....	14	1	W & H	220	42	9	0	H & S	100	33
Gilmanton.....						4	1		200	*
‡ Goffstown.....	7	0	C & C	50	25	4	1	C & D	20	90
† Gorham.....						8	0	*	*	*
Hampstead.....	2	0	C & C	50	65					
Hampton.....	10	0	Hg	70	60	5	1	N	75	100
Hanover 5.....	20	1	G	150	40					
Haverhill.....	5	1	C & C		40					
Henniker.....	4	0	G	250	50					
Hillsborough.....	6	0	H	320	42					
† Hinsdale.....						15	4	*	*	*
† Holderness 5.....	7	1	M & G	100	15	9	0	M & A	100	20
Hopkinton.....						12	1	N	125	115
Keene.....	22	3	M & G	*	40	14	0	N	400	165
Kimball Union.....	17	8	W & H	300	43	9	0	N	100	180
Laconia.....	22	0	M & G	250	38	16	0	N	200	100
Lancaster.....	10	0	H	260	53	8	1	N	500	100
Lebanon.....	13	2	W & H	400	40	17	0	P	100	175
Lisbon.....	5	0	G	100	110	2	0	W	40	61
Littleton 5.....	21	1	H	250	55	5	0	N	70	145
Manchester.....	147	5	W & H	800	43	34	3	H & S	500	60
St. Anselm's.....	10	2	W & H	200	50	4	2	R	200	60
† Marlborough.....	17	3	G	100	0					
McGaw.....						11	0	N	5	170
Milford.....	19	0	C	275	45	22	1	W	200	46
Milton.....	3	0	H & B	100	40					
Nashua.....	31	3	W & H	175	40	62	5	N	0	60
† New Boston.....	1	0	G	25	36	3	1	N	50	150
New Hampton.....	15	0	C & C	*	*	4	0	N	*	100
New Ipswich.....	2	2	H & B	300	40	1	0	N	*	115
Newport.....	6	0	M & G	60	45	5	1	N	50	150
Pembroke.....	6	0	G	150	55	7	0	A	100	70
Penacook.....	15	3	C	155	50					
Peterborough.....	7	2	W & H	*	40					
† Pinkerton.....	12	0	C & C	300	28	17	3	A	0	100
Pittsfield.....	9	0	W & H	100	115					
Plymouth.....	19	1	W & H	100	79	8	0	W	*	100
Portsmouth.....	9	0	H	30	45	7	0	N	20	*
Proctor.....	2	1	A	70	40					
Robinson.....	11	0	Hg		70	14	1	N		130
Rochester 5.....	14	0	W & H	75	40	13	0	W	30	60
Sanborn.....	16	2	W & H	400	43	9	0	N	200	160
Somersworth.....	9	0	C	200	48	13	0	*	100	115
Stratford.....	2	0	G	50	45					

TABLE No. 30.—*Continued.*

	PHYSICS.					CHEMISTRY.				
	No. passed.	No. failed.	Text.	No. problems.	No. experiments.	No. passed.	No. failed.	Text.	No. problems.	No. experiments.
Tilton.....	44	6	M & G	35	45	22	0	N	20	52
Walpole.....	3	0	C & C	200	40					
† Warner.....	15	3	M & G	250	0	4	0	N	50	*
Whitefield.....						14	0	N	10	36
Wilton.....						7	0	N	30	*
Winchester.....	5	0	G	75	40	6	0	W	60	100
Woodsville.....	12	0	W & H	175	40					

## SUMMARY.

Totals.....	857	65				530	32			
Percentage failed ....		7					6			
Averages.....				183	46				114	98

## STANDARDS.

*Physics.* (1) The elementary principles of mechanics, heat, light, sound, and electricity, as outlined in various standard texts. (2) Not less than forty illustrative experiments from approved list to be worked by individual pupil and recorded in note book. The lists most commonly used are those known as the National and the Harvard. That given in the standard program for secondary schools is essentially the National list. (3) The further illustration of principles by the working of a sufficient number of physical calculations under each of the topics treated. No specific minimum has been named.

*Chemistry.* (1) The study of a standard text, the same subject to the approval of this department. (2) Not less than fifty illustrative experiments to be worked out in the laboratory by each pupil and the results entered in notebooks. A list of experiments is suggested by the

standard program, and the list worked out must be at least the equivalent. (3) Chemical calculations sufficient in number and character to insure the exact comprehension of the principles taught.

*Equipment.* So far as is known to the department every school offering physics or chemistry has a laboratory equipment sufficient to enable the requirements named above to be met and carried out. The approved high schools and academies of the state are well equipped for the teaching of physics and chemistry.

*In general*, about eighty-four per cent. of our secondary schools offer physics and chemistry. In many of the smaller schools consecutive classes are combined and physics and chemistry taught in alternate years, thus economizing time to such an extent as to make it possible to offer both subjects. Eleven per cent. of the schools offer physics alone, and three per cent. having courses not less than four years offer neither physics nor chemistry.

## BOTANY AND ZOOLOGY.

### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in Botany and Zoölogy are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

†=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

H=Herbarium collected.

M=Morphological.

P=Physiological.

N=Study of living creatures, often with field work.

JKH=Jordan, Kellogg & Heath.

C=Colton.

Nm=Needham.

Bt=Burnet.

L=Leavitt.

D=Davenport.

F=French.

Bl=Blaisdell.

B=Bailey.

L&K=Linville & Kelley.

Bn=Bergen.

Cl=Coulter.

G=Gray.

K=Kellogg.

Cp=Cooper.

TABLE No. 31.

	BOTANY.					ZOOLOGY.				
	No. pupils passed.	No. pupils failed.	Text used.	Proportion of time devoted to laboratory.	Character of laboratory work.	No. pupils passed.	No. pupils failed.	Text used.	Proportion of time devoted to laboratory.	Character of laboratory work.
Alton .....	4	0	B	20	H	2	2	S	10	M
‡Amherst 2 .....										
Antrim .....	10	0	B	40	H M P					
Atkinson .....	3	1	Bn	30	H					
Bethlehem .....	4	0	Bn	40	M P					
Claremont .....	28	1	Bn	30	H					
Coe's .....	5	0	B	50	H M P	6	0	J K H	30	M
Colby .....	5	0	Bn	12	M P	14	1	C	15	M
Colebrook .....	8	2	G	60	H M P					
St. Mary's .....	3	0	B	*	H M P					
Dover .....	26	0	Bn	25	M P					
Dow .....						7	0	Bt		M
Farmington .....	8	0	Bn	67	M H	8	0	C	40	M
Gilmanton .....	4	2	B	40	M P	4	1	D	40	M
‡Goffstown .....	1	0	G & Bn	50	P	2	2	C	0	0
Hampton .....	4	0	Bn	50	H M	8	1	Bt	20	M
Hanover 5 .....	9	1	Bn	100	H M P	10	1	C	100	M
Haverhill .....						5	3	D	50	N
Henniker .....						8	1	Cp	40	M
Hillsborough .....	4	0	B	40	H M P	4	0	Bt	80	M
† Hinsdale .....	1	0	Bn	25	M	0	1			
Holderness 5 .....	9	2	Bn	50	H					
Lancaster .....	6	0	Bn	30	H M P	6	0	D	30	M N
Littleton 5 .....	5	1	Bn	30	H M P	7	0	J K H	30	M
Manchester .....	20	1	Bn	80	H M P	18	2	C	80	M
Milford .....	16	1	Bn	70	H M P					
Milton .....	7	1	G	30	H					
Nashua .....	9	0	Bn	80	H M	10	0	D	50	N
New Hampton .....	12	0	Bn	30	H M P	16	0	L & K	30	M
New Ipswich .....	4	1	Bn	50	M	5	0	L & K	50	M
Newport .....	3	0	B	50	H M	4	1	C	0	0
Pembroke .....	4	0	Bn	50	M H					
Peterborough .....	8	0	Cl	30	H M P	9	0	K	30	P
Pinkerton .....	10	0	B	50	H M P	10	0	J K H		N
Plymouth .....	12	1	B	50	H M P	18	3	Nm	50	M
Portsmouth .....	8	1	B	20	P	9	0	0	40	M
Proctor .....	6	3	L		N					
Robinson .....	7	0	Bn	50	N	7	0	J K H	50	N
Rochester 5 .....	19	1	Bn	25	P					
Sanborn .....	6	0	Bn	20	H					
Tilton .....	22	3	Bn	30	P	24	1	Bt	75	N
Troy 1 .....	6	0	Bn	20	H	6	0	C	5	M
Warner .....	3	3	Bn	60	H M P	6	1	F	30	M
Whitefield .....	4	1	Bn	*	M	8	0	Bt	16	M
Wilton .....	4	0	B	25	M P	5	0	J K	25	M

## SUMMARY.

Totals .....	327	27				246	21			
Percentage failed .....		8					8			
Averages .....				42					37	

## STANDARDS.

At the existing stage of biological instruction it is difficult to determine secondary standards of attainments with the precision possible in other subjects.

In Botany the following outline of work is recommended to be covered:

1. Preliminary study of a complete plant of moderate size, one specimen in flower and one in fruit, to show the parts and organs, their arrangement, and their uses, and to bring out the general functions of nutrition, circulation, reproduction, etc., which they perform.

2. A general study, in order, of stems, roots, leaves, flowers (such as may be available in the fall), fruits, and seeds, to bring out the variety of forms and uses of the several parts of the plant.

3. A systematic study of the vegetable kingdom, beginning with the simplest forms, and advancing through the several groups. Each group should be introduced by the study of a type form, which should afterwards be compared with allied forms, and supplemented by the study of text-book and references under the careful direction of the teacher.

4. Generalizations may then be made concerning the nature and relations of plant forms, their life and habits, under such topics as:

- The necessary conditions of plant life,
- The struggle for existence and natural selection,
- Adaptations to environment,
- The chief lines of progress,
- Germes and their relation to disease,
- Putrefaction, etc.,
- Vegetable parasites,
- Plant societies,
- Means of protection,

Fertilization,

and the relations of plants and animals (in connection with this topic may appropriately be made some study of spring flowers) ;

Artificial selection, and the development of new varieties of flowers and fruits;

The geological distribution of plants,

The development of the plant kingdom in time, etc.

5. Final review and summary in the light of these generalizations, the theory of evolution.

In Zoölogy, the following:

1. A general survey of the anatomy and physiology of the human body based upon the pupils' previous studies of physiology, and their general knowledge, to review that general knowledge, and serve as a foundation for the study of other animal bodies. In this the teacher should bring out the broad facts concerning the structure and arrangement of the organs of the body, their uses, and the general functions of nutrition, circulation, respiration, locomotion, sensation, etc., which they perform.

2. The general scheme of classification of the animal kingdom, embracing the relation of its principal divisions, to give a preliminary bird's-eye view of the whole, and enable the pupils the better to apprehend the places therein of the several forms which they study when they reach them in turn.

3. The systematic study of the animal kingdom may then be commenced, beginning with the simplest forms. One or more type forms of each important class should be carefully studied in the laboratory, compared with specimens of allied forms, and supplemented by study of textbooks and references. Careful directions should be given by the teacher for all references that are to be looked up in other books. This work will occupy about two-thirds of the entire time assigned to the course. It may be divided as follows:



Protozoa,	Mollusks,
Sponges and cœlenterata,	Anthropods.
Echinoderms.	Vertebrates.
Vermes,	

4. Generalizations may then be made concerning the nature and relation of animal forms, their life and their habits, under such topics as: the necessary conditions of animal life; the struggle for existence and natural selection; adaptations to environment; the chief lines of advance; parasitism and degeneration; protective resemblances; animal communities; homes and domestic habits; instinct and reason; the geographical distribution of animals; the development of the animal kingdom in time, etc.

5. Final review and summary in the light of these generalizations; the theory of evolution and the relation of the human race to the animal kingdom.

Roughly speaking, these outlines represent both the method used and the ground covered in New Hampshire schools during the past year. In some schools, the work has been excellent; in the majority, indifferent. More definite work, better articulated with nature study below, and of more nearly uniform excellence must wait upon experience, upon more general recognition by collegiate authority, upon the creation of an adequate division of inspections in this department.

It is a pity that the biological sciences should not receive more attention in both the secondary school and the college. While physics and chemistry are the foundation of all studies dealing with material things, it is equally true that biology is the foundation of all studies dealing with living things. The thought of the world is increasingly according to biological methods, and is increasingly done in terms of biology. It is hard to see how any other subject has a greater educational value.

## PHYSICAL GEOGRAPHY, PHYSIOLOGY, GEOLOGY. ASTRONOMY.

## ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in physical geography, physiology, geology and astronomy are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

F=Field work.

M=Map work.

W=Weather observations.

Mn=Mineralogical.

Ob=Observational.

C=Construction work.

Ds=Dissection.

Ck=Comstock.

B=Brigham.

Cn=Cotton.

Mt=Martin's Human Body.

D=Davis.

G&B=Gilbert and Brigham.

Dr=Dryer.

T=Tarr.

Mth=Monteith.

Bl=Blaisdell.

H=Hutchinson.

Da=Dana.

Y=Young.

S=Steele.

Td=Todd.

Fs=Fairbanks.



TABLE No. 32.

PHYSICAL GEOGRAPHY.						PHYSIOLOGY.					
	No. passed.	No. failed.	Text used.	Proportion to lab'tory work.	Character of lab'tory work.		No. passed.	No. failed.	Text used.	Proportion to lab'tory work.	Character of lab'tory work.
				%						%	
Bethlehem ...	4	0	D	0		Robinson ...	12	0	Cn	30	Ds
Colby.....	13	0	D		F	New Hampton	15	0	Mt	*	*
Colebrook...	9	0	D	0		New Boston...	6	1	Bl	*	Ds
Concord.....	20	3	D	0	M	St. Mary's....	2	0	H	0	
Dover.....	29	0	D	0		Holderness 5..	1	0	Bl	30	Ds
Franklin 5....	23	7	D	25	M W F	GEOLOGY.					
Hampton.....			G & B	*	M W F	Franklin 5....	11	0	T	10	C F
Keene.....	16	0	Dr	0		Hopkinton....	11	0	Da	*	*
Manchester...	30	1	D T	60	Mn	Woodsville...	6	0	B	0	0
Milford.....	18	1	T	30	W F	ASTRONOMY.					
Milton.....	6	1	T	20	Mn M W	Franklin 5....	13	0	Y	...	Ob.
Nashua.....	16	0	Fs	...		Hampton.....	5	0	S	...	Ob.
New Boston ..	6	0	Mth	20	M W F	Keene.....	16	0	Y	...	...
New Hampton	16	0	T	*	M Mn W F	Manchester...	22	0	Y	0	...
Newmarket 5.	6	0	D	0		Nashua.....	14	0	Td	0	...
Pinkerton....	9	1	D	0	M F	Woodsville...	5	1	...	0	0
Portsmouth...	9	1	B Ck	20	M						
Proctor.....	6	3	T	*	M						
Rochester 5. .	22	1	D	*	Mn						

## SUMMARIES.

PHYSICAL GEOGRAPHY.				PHYSIOLOGY.			
	No. passed.	No. failed.	Proportion to lab'tory work.		No. passed.	No. failed.	Proportion to lab'tory work.
Total.....	258	19		Total.....	36	1	
Percentage failed.		6		Percentage failed.		3	
Average.....			10%	Average.....			20%
GEOLOGY.				ASTRONOMY.			
	No. passed.	No. failed.	Proportion to lab'tory work.		No. passed.	No. failed.	Proportion to lab'tory work.
Total.....	28	0		Total.....	65	1	
Percentage failed.		0		Percentage failed.		1	
Average.....			10%	Average.....			0

The sciences listed in Table No. 32 have not thus far been treated in the secondary program and no standard has been prescribed. Their place in the secondary program is uncertain. The character of the work done has been adequate and good in some schools, notably physical geography, geology and astronomy at Franklin, physiology and physical geography at New Hampton, physical geography at Manchester and Milton. In most others it has tended to be the receptacle of the indifference and spare time of both teachers and pupils. If the subjects continue to be taught, they must of course be standardized as to ground to be covered and attainments to be made.

## HISTORY.

### ABBREVIATIONS.

Abbreviations used in the following table relating to the work of secondary schools in history are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

*a*=History of Art.

*b*=Church History.

*c*=General History. To be discontinued.

Ex=Extensive. That is, collateral reading or historical geography done systematically and to some considerable extent.

Oc=Occasional.

R=Reference. That is, collateral reading and historical

geography done only to the extent of looking up references.

O=No work at all in line so marked.

M&W=Myers & Wolfson.

M=Montgomery.

Hg=Harding.

Mr=Myers.

Wn=Wolfson.

Wr=Walker.

T=Tappan.

W=West.

A=Allen.

H=Hart.

Ch=Chancellor.

Cy=Cheyney.

Ay=Ashley.

Bs=Barnes.

Wg=Wring.

C&K=Coman & Kendall.

R=Robinson.

L=Larned.

C&G=Cornman & Gerson.

Am=Adams.

My=Morey.

E=Emerton.

Ms=Morris.

Mo=Munro.

F=Fiske.

As=Andrews.

VD=Van Dyke.

Mc=McLaughlin.

S=Shinn.

H&C=Higginson & Channing. Mac=Maclear.

TABLE No. 33.

	ANCIENT HIST.				ENGLISH HIST.				MEDIEVAL & MODERN.				U. S. HISTORY ADV.			
	No. passed.	No. failed.	Text used.	Collateral reading.	Historical geography.	No. passed.	No. failed.	Text used.	Collateral reading.	Historical geography.	No. passed.	No. failed.	Text used.	Collateral reading.	Historical geography.	
Alton .....	17	3	M & W	R	Oc	3	0	M	O		4	0	M	Oc	Ex	
Antrim .....	26	0	B	Ex	Oc						9	0	C	R	Ex	
† Atkinson .....	7	3	Mr	Oc	Oc						3	0	M	R	O	
Austin-Cale .....	6	0	Mr	R	Oc						17	0	F	R	Oc	
Berlin .....	19	2	Mr	Ex	Ex											
Bethlehem .....	4	0	B	Ex	Ex											
Bristol .....	6	0	Mr	Ex	Ex						3	0	C	Oc	Oc	
Claremont .....	39	5	Mr	Ex	Ex	10	0	W	Ex		22	0	C	Ex	Ex	
Coe's .....	7	2	Mr	Ex	Ex	4	0	Cy	Ex							
Colby .....	46	2	Mr	Ex	Ex						9	0	H	Oc	Oc	
Colebrook .....	32	3	W	Ex	Ex	15	0	Cy & C	Ex		46	0	Mc F	Ex	Ex	
Concord .....	118	27	Mr	Ex	Ex	4	0	H & C	Ex							
S. Mary's .....	5	0	B	Ex	Ex	11	0	Cy	Ex		53	6	H	Ex	Ex	
Dover .....	78	6	B	Ex	Ex											
Dover .....	3	3	W	R	Oc						4	0	M	Ex	Ex	
Edging .....	5	1	Mr	R	Oc	3	0	M	Ex		15	1	C F	Ex	O	
Exeter .....	11	0	W	R	Oc	23	0	T	R							
† Farmington .....	16	0	Mr A	O	Oc						8	0	C	O	Oc	
Franklin .....	25	7	Mr	Ex	Ex	19	2	M	Ex		21	0	Mc	Ex	Ex	
Gilmanston .....	2	2	Mr	Ex	Ex						4	0	C	Ex	Ex	
† Goddard .....	13	6	Mr	O	O						8	0	H	R	O	
† Gorham .....	9	3	W	O	Oc	4	0	M	Ex		6	0	H			
Hamstead .....	6	1	Mr	R	Oc											
Hampton .....	12	1	Mr	R	Oc	9	0	T	Ex		6	0	Ch	R	Oc	
Hanover .....	17	4	Mr	Ex	Ex						8	0	C		Ex	

TABLE No. 33.—Continued.

ANCIENT HIST.				ENGLISH HIST.				MEDIEVAL & MODERN.				U. S. HISTORY ADV.			
No. passed.	No. failed.	Text used.	Collateral reading.	Historical geography.	No. passed.	No. failed.	Text used.	Collateral reading.	Historical geography.	No. passed.	No. failed.	Text used.	Collateral reading.	Historical geography.	
16	4	Mr	Oc	Oc	4	1	M	O	O	4	1	H	Oc	O	
Haverhill	9	W	R	Ex	9	0	M	Oc	R	2	0	Bs	R	Ex	
Henniker	10	6	Mr	Ex	10	2	C & K	Ex	Ex	4	0	C	Ex	O	
Hillsborough	3	3	Mr	O	10	0	M	Ex	Ex	10	0	Mc	R	Ex	
Hinsdale	5	0	Mr	Oc	15	0	C & K	Oc	Oc	10	0	M	Ex	O	
Holderness 5	13	0	Mr	Ex	19	0	Cy	Ex	Ex	12	0	C	Ex	Ex	
Hopkinton	56	16	Mr	Oc	25	0	M	Ex	Ex	32	1	C	Oc	Oc	
Keene	7	0	B	Ex	10	2	As	Ex	Ex						
Kimball Union	35	10	Mr	Oc	12	0	M	Ex	Ex						
Laconia	26	2	Mr	Oc	9	1	M	Ex	Ex						
Leicester	12	0	Mr	Ex	3	0	M	Ex	Ex						
Lebanon	12	4	Mr	Ex	39	1	Cy	Ex	Ex	23	3	Mr	Oc	Oc	
Lisbon	12	4	Mr	Ex	11	1	Mr	Ex	R	11	1	Mr	Ex	R	
Littleton 5	27	3	Mr	Ex	12	3	M	O	O	12	15	Mr	O	Oc	
Manchester	87	3	Mr	Ex											
St. Anselm 8	19	5	Mr	Ex											
† Marlborough															
Mercedith 2	10	0	Mr	Ex											
McGaw	12	1	Mr	O	2	0	M	Oc	Oc	21	2	Mr	Oc	Oc	
Milford	29	1	Mr	Ex	14	0	M	Ex	Ex	13	0	C	Ex	Ex	
Milton	18	2	Mr A	Ex	36	3	Wg	Ex	R	41	0	R	Oc	R	
Nashua	87	8	Mr	Ex	36	0	M	Oc	Oc	33	0	M	Oc	Oc	
† New Boston	7	0	Mr	Oc	1	0	M	Oc	Oc	26	0	M	Oc	Oc	
New Hampton	6	0	Mr	O	39	0	M	Oc	Oc	3	0	M	Oc	Oc	
New Ipswich	8	9	Mr	O	1	1	C & K	Ex	R	9	0	C	Ex	O	
Newmarket 5	4	0	Mr	O	4	1	Cy	Ex	R	7	0	C	Ex	R	
Newport	11	0	Mr	Ex	13	1	Cy	Ex	R	9	0	H	Oc	R	



	11	22	Mr	Ex	R	0	Cy	Ex	R	3	0	Mr	Ex	Ex	71	0	M	Ex	R
Pembroke	51	2	Mr	Ex	Ex	5	0	Cy	Ex	3	0	Mr	Ex	Ex	9	0	M	Ex	R
Penarconk	18	4	Mr	Ex	Oc	7	6	T M	Ex				Ex	Ex	10	0	C	Ex	Ex
Peterborough	29	3	Mr	Ex	Ex	14	3	Cy	Ex					Ex	23	0	M	Ex	R
Pinkerton	12	16	Mr	Ex	R										8	0	C	Oc	Oc
Pittfield	35	3	Mr	Ex	Ex	4	1	M	Ex	5	6	Mr	Ex	Ex	14	2	M	Ex	Oc
Plymouth	83	8	Mr B	Ex	Ex	31		M	Ex	27	2	Mr	Ex	Ex	35	1	H C	Ex	Ex
Portsmouth	15	1	Mr	Ex	Ex	4	2	L	Oc										
Proctor	83	1	Mr	Ex	Ex	21	1	Cy	Ex										
Robinson	8	4	W	Ex	R				R	12	1	Mr	Ex	Ex	34	2	M	Ex	Oc
Rochester 5	59	4	W	Ex	Ex	8	1	Cy M	Oc						32	0	H	Ex	R
Rochester	21	3	Mr	Ex	Oc	10	1	L	Oc	10	0	Mr	O	O	12	0	M	Ex	R
Sanborn	24	12	Mr	Ex	Ex					6	1	Mr	Ex	Ex	15	0	H	Ex	Oc
Somersworth	13	0	Mr	Ex	R	8	1	W	Ex						4	0	H	Oc	Oc
Strafford	28	5	Mr	Ex	Ex										29	3	M	Ex	Ex
Tilton	10	0	Mr	Oc	Oc														
Troy 1																			
Walpole	17	10	B	Oc	R	12	1	M	Oc	7	3	Hg	Oc	Oc	3	0	F	Oc	O
Warner	6	8	W A	Oc	Oc	8	2	H & C	Oc						19	2	M	Oc	Ex
Whitefield	9	0	Mr	Oc	Ex	11	0	M	Ex										
Whitton	12	1	B Mr	O	Oc										6	0	F	Ex	Oc
Winchester	12	1	B Mr	O	Oc										6	0	C	Ex	Ex
Woodsville	12	3	Mr	Oc	R					4	0	W	Ex	Ex	5	0	C	Oc	R

## SUMMARY.

Totals	1505	248
Per cent. failed	14	
Average per cent. Ex.	56	43
Average per cent. Qc.	23	26
Average per cent. R.	11	16
Average per cent. O.	10	3
		530
	33	
	6	
		63
		26
		5
		6
	252	
	37	
	13	
		945
	25	
	33	
	43	
	28	
	10	
	29	
	14	
		60
		25
		12
		3
		47
		17
		15
		13

## STANDARDS.

*Ancient History.* From beginnings in Egypt and Tigris-Euphrates valley to Charlemagne, 800 A. D.

*Medieval and Modern.* From foundation of empire of Charlemagne to recent European history.

*English History.* From Roman conquest to recent.

*Advanced United States History.* Study of constitutional and economic development suited to the age of high school seniors. Most schools fulfil the statutory requirement for the study of the constitutions of the United States and New Hampshire in this way.

It is expected that all history courses will be pursued with due regard to extensive historical reading and to the study of the inter-relations of geography and history. For this purpose, a school not provided with adequate historical collateral reading will be held to be not properly equipped within the meaning of the law. Specifications will be furnished by this office. In case the local public library is so situated as to be able to furnish the necessary books, the school will be considered to be properly equipped.

## CONDITION OF HISTORICAL INSTRUCTION.

Few subjects have undergone a more radical reform in method within the lifetime of a generation than history. Until comparatively recent years, instruction in history was almost universally limited to the simple means of requiring pupils to commit a meager text-book to memory. History courses, like English courses, were committed to the spare time of the youngest or weakest teacher, and were often simply a safe pound in which to keep pupils who were mentally too inert for the sterner subjects. Needless to say, history was unpopular. Changes from such conditions have been unsteady, often the vagaries of people who knew little about teaching and still less about children, often more absurd than the conditions they were designed to correct.

But the net result has been a very appreciable gain in the direction of using courses in history for effective stimulus of interest in historical thought and inquiry, and in the direction of instruction in the art of reading history. Such excellent work requires, of course, the teacher of rare good sense and rare appreciation, with the addition of sufficient equipment in the direction of an historical library. Since history is a subject which anybody can enjoy and profit from who can read, it is less than worth while to have history taught in school at all unless the teaching is of the character I have indicated.

Referring to the summary of Table No. 33, on page 233, the relative extent to which courses are marked with the abbreviation Ex may be taken as indicative of the character of the teaching. A school which is making a serious attempt at extensive and systematic collateral historical reading is probably a school which is doing praiseworthy historical teaching. A school which is doing no historical reading at all, which is merely retailing the text-book from day to day, is not teaching history at all. Such schools must either improve their work, or drop history altogether, or drop off the approved list. It appears from the summary to which reference is above made, that history teaching varies from praiseworthy to excellent in rather more than one-half our high schools and academies; that it was time worse than thrown away in from eight to twenty per cent., varying somewhat with the course.

#### COMMERCIAL OR ADVANCED ARITHMETIC AND STENOGRAPHY AND TYPEWRITING.

##### ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in commercial arithmetic, stenography and typewriting.

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

§=Rate of taking down notes and transcribing same.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

W=Williams.

K=King.

W&R=Williams & Rogers.

A=Anderson.

M&M=Moore & Miner.

G=Gregg.

M=Moore.

PH= Pitman-Howard.

W&G=Whogan & Goodyear.

C=Chandler.

SR=Sadler-Rowe.

P= Pitman.

Pd=Packard.

Gm=Graham.

Me=Milne.

DP=Dement-Pitman.

Gf=Greenleaf.

TABLE No. 34.

[illegible]

TABLE No. 34.—*Continued.*

	COM. OR ADV. ARITHMETIC.			STENOGRAPHY I.			STENOGRAPHY II.			TYPEWRITING.			
	Pupils passed.	Pupils failed.	Text used.	Pupils passed.	Pupils failed.	System taught.	Average speed on new matter at end of year.	Pupils passed.	Pupils failed.	Average number of pupils to machine.	Average speed in transcribing own notes. First course.	Average speed in transcribing own notes. Second course.	
Newmarket 5.....	4	1	W & M	3	1	Gm	.....	5	0	2.0	.....	.....	
Penacook.....	12	0	M & M	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pinkerton.....	16	5	M & M	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsfield.....	8	3	M & M	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Plymouth.....	8	2	Wm	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Portsmouth.....	31	21	M	12	4	P	60	1	0	2.0	.....	.....	
Proctor.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Rochester 5.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Sanborn.....	10	1	M & M	17	4	D	60	13	0	7.5	.....	.....	
Somersworth.....	10	0	K	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Tilton.....	16	2	M & M	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Warner.....	7	3	M & M	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Whitefield.....	4	0	W & R	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wilton.....	5	0	M & M	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Totals.....	436	93	.....	297	24	.....	.....	140	7	.....	.....	.....	
Per cent. failed.....	18	.....	.....	10	.....	.....	.....	5	.....	.....	.....	.....	
Averages.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
							56				17	30	

SUMMARY.

## STANDARDS.

No standard has been defined for commercial and high school arithmetic, beyond general suggestions in the Standard Program.

In stenography, the standard set is that at the end of the second course pupils must be able to write accurately in shorthand from dictation, new matter, at the rate of one hundred words per minute.

In typewriting the pupil is expected to be able at the end of the second course to transcribe his own notes at the rate of fifty words per minute for three minutes.

The courses in commerce are prone to become receptacles for weak or lazy pupils on the one hand, or for nerveless teachers on the other. Schools which propose to teach these subjects ought to teach them as thoroughly as they do the other subjects.

## BOOKKEEPING OR BUSINESS PRACTICE.

## ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in bookkeeping are here given.

\*=Work sufficient, but report not in form to be conveniently recorded here.

†=Defective in this subject and notified.

‡Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

1=Pupils passed and failed.

2=Text used, which also indicates the method.



TABLE No. 35.

I.		II.	
Berlin.....	1. 8-5. 2. Wholly by actual accounts.	1. 11-1. 2. Wholly by actual accounts.	
Bethlehem.....	1. 3-0. 2. Moore & Miner.		
Claremont.....	1. 7-1. 2. Sadler-Rowe.		
Colby.....	1. 11-3. 2. Moore & Miner.		
Concord.....	1. 25-3. 2. Williams & Rogers.		
Dover.....	1. 18-0. 2. Williams & Rogers.	1. 18-0. 2. Williams & Rogers.	
Exeter 3.....	1. 23-0. 2. *	1. 25-0. 2. Williams & Rogers.	
Farmington.....			
Franklin 5.....	1. 8-3. 2. Moore & Miner.	1. 11-0. 2. Neal & Craigin.	
Hampton.....	1. 2-0. 2. Moore & Miner.		
Hopkinton.....	1. 11-0. 2. Williams & Rogers.		
Keene.....	1. 27-7. 2. Williams & Rogers.		
Laicester.....	1. 9-0. 2. Mod. Ill. Bkg.	1. 8-0. 2. Mod. Ill. Bkg.	
Lelanon.....	1. 12-2. 2. Sadler-Rowe.	1. 8-0. 2. Sadler-Rowe.	
Littleton 5.....	1. 6-1. 2. Moore & Miner.		
Manchester.....	1. 91-1. 2. Williams & Rogers.	1. 30-0. 2. Mod. Ill. Bkg.	
St. Anselm's.....	1. 10-1. 2. Williams & Rogers.	1. 4-0. 2. Williams & Rogers.	
Milton.....	1. 3-0. 2. Moore & Miner.		
Nashua.....	1. 19-1. 2. Williams & Rogers.	1. 10-1. 2. Williams & Rogers.	

New Hampton	1. 14-0.	1. 14-0.
Pembroke	1. 11-0.	1. 11-0.
Penacook	2. Meservey.	2. Meservey.
Pinkerton	1. 10-2.	1. 10-2.
Pittsfield	2. Moore & Miner.	2. Moore & Miner.
Plymouth	1. 3-1.	1. 3-1.
Portsmouth	2. Moore & Miner.	2. Moore & Miner.
Proctor	1. Moore & Miner.	1. Moore & Miner.
Rochester 5	2. 6-3.	2. 6-3.
Somersworth	1. Moore & Miner.	1. Moore & Miner.
Stratford	2. 19-9.	2. 19-9.
Tilton	1. Neal & Craigin.	1. Neal & Craigin.
Walpole	2. 19-4.	2. 19-4.
Warner	1. Williams & Rogers.	1. Williams & Rogers.
Whitefield	2. 6-0.	2. 6-0.
Wilton	1. Williams & Rogers.	1. Williams & Rogers.
	2. 10-0.	2. 10-0.
	1. Montgomery.	1. Montgomery.
	2. 1 set Williams & Rogers.	2. 1 set Williams & Rogers.
	1. 8-0.	1. 8-0.
	2. Moore & Miner.	2. Moore & Miner.
	1. 13-0.	1. 13-0.
	2. Moore & Miner.	2. Moore & Miner.
	1. 13-0.	1. 13-0.
	2. Moore & Miner.	2. Moore & Miner.
	1. 7-0.	1. 7-0.
	2. Moore & Miner.	2. Moore & Miner.
	1. 4-0.	1. 4-0.
	2. *	2. *
	1. 4-0.	1. 4-0.
	2. Moore & Miner.	2. Moore & Miner.

## SUMMARY.

	I	II
Pupils passed,	445	164
Pupils failed,	45	7
Per cent. failed,	9	5

The method followed in teaching bookkeeping is in all but four schools to simulate as nearly as possible actual commercial conditions, handling the bookkeeping of make-believe sales, purchases and loans, using cash which is like real cash in all but value, becoming accustomed to banking transactions and acquainted with the business forms of shipping.

One school, Berlin, uses the actual business of the city school department for its practice. The pupils thus become familiar with the actual handling of an annual expenditure of about \$30,000, paying teachers and other employees, keeping track of the daily consumption of coal and other supplies, determining the cost of maintaining and operating each building and each department of school work, keeping interest and sinking fund accounts and much else beside. It is probably safe to say in addition that the books of the school department were never better kept.

In Pembroke, Somersworth and Whitefield the teaching of bookkeeping appears to have been purely or mainly an affair of studying text-book accounts.

COMMERCIAL LAW, COMMERCIAL GEOGRAPHY, COMMERCIAL  
AND INDUSTRIAL HISTORY.

## ABBREVIATIONS.

Abbreviations used in the following table relating to work of secondary schools in commercial law, commercial geography, and commercial and industrial history:

\*=Work sufficient, but report not in form to be conveniently recorded here.

‡=Defective in this subject and notified.

‡=Approval not renewed July 15, 1908.

..=Indicates no course this year.

Numeral following name of school shows number of years in its course. When no numeral is given, four is to be understood.

*Law.*

1=Pupils passed and failed.

2=Text used.

3=Extent to which cases have been used to illustrate.

*Geography.*

1=Pupils passed and failed.

2=Text used.

3=How much and what map work.

4=Illustrative work.

*History.*

1=Pupils passed and failed.

2=Text used.

3=Historical geography.

4=Collateral reading.

TABLE No. 36.

	COMMERCIAL LAW.	COMMERCIAL GEOGRAPHY.	COMMERCIAL AND INDUSTRIAL HISTORY.
Berlin .....	1. 14-1. 2. Gano, 4. Fully $33\frac{1}{3}$ per cent.	.....	1. 20-1. 2. No text used. 3. Fully. 4. Wholly by collateral reading.
Bethlehem .....	1. 5-1. 2. Huffcut. 3. 0.	.....	.....
Colebrook .....	1. 10-0. 2. Huffcut. 3. Almost entirely.	1. 10-0. 2. Tilden-Clarke. 3. 10 per cent. 4. Consular reports--little else.	.....
Concord .....	1. 23-0. 2. Huffcut. 3. Extensively.	1. 39-7. 2. Adams. 3. Production, industry and physical charts made. 4. A very little museum work.	1. 20-1. 2. Webster. 3. None. 4. Little.
Dover .....	1. 25-0. 2. White. 3. Moderate.	1. 50-0. 2. Adams. 3. Slight. Production, industry and route charts. 4. None.	.....
Hampton .....	1. 4-1. 2. Huffcut. 3. Little.	.....	.....
Lebanon .....	.....	1. 11-0. 2. Macfarlane. 3. Production, consumption, industry, route charts. 4. Government reports and periodicals, a little museum work and visiting.	1. 11-0. 2. Webster. 3. Fully. 4. Very little.

Littleton 5 .....	1. 5-0. 2. White. 3. Extensively.	1. 4-2. 2. Adams. 3. Production and political charts. 4. None. 1. 35-1. 2. Adams. 3. Very little. 4. None.	1. 32-1. 2. Webster. 3. None. 4. Little.
Manchester.....			
St. Anselm's.....	1. 4-0. 2. Gano. 3. Extensively.	1. 14-0. 2. Gannett, Garrison and Houston. 3. Political locations. 4. None.	
McGaw.....			
Nashua.....	1. 17-0. 2. Huffcut. 3. Extensively.		
New Hampton....	1. 14-0. 2. Townsend. 3. Moderate.		
Penacook.....	1. 1-0. 2. Huffcut. 3. Moderate.	1. 9-1. 2. Adams. 3. .... 4. ....	
Pinkerton .....			
Plymouth. ....	1. 4-0. 2. Richardson. 3. Moderate.	1. 9-2. 2. Gannett, Garrison and Houston. 3. Production and route charts. 4. Photos, specimens, reading.	
Portsmouth .....	1. 10-0. 2. Huffcut. 3. Very little.	1. 6-0. 2. Redway. 3. Very little. 4. None.	
Proctor.....	1. 15-3. 2. Gano, Williams & Rogers. 3. Lectures by practicing attorney.	1. 10-1. 2. Adams. 3. Extensive chart work. 4. Small museum in constant use.	
Rochester 5.....	1. 13-0. 2. Huffcut. 3. Moderate.		

TABLE No. 36.—*Continued.*

	COMMERCIAL LAW.	COMMERCIAL GEOGRAPHY.	COMMERCIAL AND INDUSTRIAL HISTORY.
Tilton .....	1. 7-0. 2. Richardson. 3. ....		
Warner .....	1. 7-0. 2. Gano. 3. Extensively.	6-0. 1. Gannett, Garrison and Houston. 2. Production and industry charts. 3. .... 4. ....	
Wilton .....	1. 2-0. 2. White. 3. Extensively.	1. 5-0. 2. Adams. 3. Route and physical charts. 4. Very little.	



## SUMMARY.

	Commercial Law.	Commercial Geography.	Commercial History.
Pupils passed.	180	208	83
Pupils failed.	6	13	3
Per cent. failed.	3	6	3

## OTHER SUBJECTS.

*Mechanic and Domestic Arts and Agriculture.* Complete curricula in mechanic arts are in process of development at Berlin and Concord, in agriculture and domestic arts at Gilmanton and Coe's academies. Although two and three more years will be necessary before these curricula come into full adjustment, complete reports of the work done are given in Chapter VII.

*Political Economy.* Economics was taught as a semester course, covering a modern text-book with more or less collateral reading, in the following:

Lebanon High School.  
 St. Anselm's College.  
 Nashua High School.  
 New Hampton Literary Institution.  
 Plymouth High School.  
 Warner High School.

*Penmanship* received attention in regular courses in sixteen schools.

*Biblical Literature* was covered in several of the endowed institutions but was reported from one alone, Colby Academy.

*Music* was given a more or less prominent place in many schools. Tilton and Pinkerton provided regular courses.

*Drawing and Art.* Tilton and Pinkerton provided for regular instruction in drawing, Hillsborough gave weekly lessons in applied design with some work in iron and brass and in wood carving.

*Elements of Agriculture* was taught from a text-book as a semester course at Sanborn.

A course in *psychology* and *pedagogy* was given at Tilton.

TABLE No. 37.

## COMPARATIVE SUMMARY OF FAILURES BY SUBJECTS.

Year.	Subject.	Passed.	Failed.	Per cent failed.
I	English,	1666	250	13
	Algebra,	1320	271	17
	Latin,	1028	190	16
	Ancient History,	1505	248	14
	Commercial Arithmetic,	436	93	18
	Commercial Geography,	208	13	6
	Bookkeeping,	445	45	9
	Botany,	327	27	8
	Zoölogy,	246	21	8
	Physical Geography,	258	19	6
	Astronomy,	65	1	1
	Geology,	28	0	0
	Physiology,	36	1	3

Mean per cent. failed Year I, 16.

II	English,	1279	111	8
	Algebra,	278	54	19
	Latin,	650	71	10
	Greek,	64	3	4
	French,	1066	165	13
	German,	336	15	4
	Plane Geometry,	1232	260	17
	English History,	530	33	6
	Bookkeeping,	164	7	5

Mean per cent. failed Year II, 13.

Year.	Subject.	Passed.	Failed.	Per cent. failed.
III	English,	1098	77	6
	Latin,	553	25	4
	Greek,	45	6	12
	French,	810	48	6
	German,	202	9	4
	Plane Geometry,	174	34	17
	Solid Geometry,	216	8	4
	Physics,	857	65	7
	Mediæval and Modern His- tory,	252	37	13
	Commercial and Industrial History,	83	3	3
	Stenography,	207	24	10
	Typewriting,	364	17	4

Mean per cent. failed Year III, 7.

IV	English,	1032	23	2
	Latin,	335	11	3
	French,	532	5	1
	Greek,	32	2	6
	German,	44	2	4
	Algebra,	532	35	6
	Plane Geometry,	579	18	3
	Chemistry,	530	32	6
	United States History,	945	25	3
	Commercial Law,	180	6	3
	Stenography,	140	7	5

Mean per cent. failed Year IV, 3.

The percentage of failures is about the only test of efficiency which the reports of work done show as they come to this office. In the abstract, the percentage of pupils who pass a given course upon a fair rating is the measure of the efficiency of the teacher. In the concrete, while such

a test is a rough working measure, it is far from accurate because teachers vary more or less in the ratings which they give. Hence the efficiency of one teacher who marks closely and who has twenty per cent. of failures may in reality be higher than that of another teacher who shows but five per cent. of failures, but who rates pupils laxly. Of course the only sure method is impartial examination.

At different times various opinions concerning tests have held sway. At one time everything is aimed toward preparation for the approaching examination; at another, examinations have been deemed to be vicious and have been avoided altogether. Of course we have here a case of extremes, one of which spells meaningless cramming; the other flabby irresponsibility in pupils, great pretense coupled with great ignorance. We must retain an honest, sensible examination, aimed to show the truth about the standing of pupils, and then we must honestly accept its decision as to whether our pupils know what we think they do or not.

The disproportionately large number of failures in the first two years is undoubtedly due chiefly to two causes. (1) A good many pupils enter the secondary school either against their will or because they are indifferent. When suddenly brought face to face with the necessity of depending upon themselves alone, the necessary interest in their own education is entirely lacking and they either fail or drop out of school. Usually the latter takes place after failure, and the burden of carrying this load of hopeless lack of interest being thus lifted, the ratio of failures in the school as a whole drops rapidly after the first year. (2) The transition from elementary methods of teaching to secondary methods is altogether too abrupt. The result is that a disproportionate number of failures results during the period of adjustment in the first two years.

The lines along which this ratio of failures in the first year must be reduced are evidently the following: (1)

There must be better teaching and less lesson hearing in the secondary school. The management must learn to put its best teachers on the first year pupils, not the least experienced, as is often now the case. The teacher must learn to be ashamed of a high percentage of failures in his own classes instead of simply charging the blame off onto poor preparation. (2) Superintendents and upper grammar teachers must draw nearer to high school methods to the extent of putting a heavier responsibility upon pupils for work done. (3) If the secondary school would further reduce this number of failures it will do well to open curricula in mechanic and domestic arts and in agriculture. Many of those who fail do so because they are motor-minded rather than eye-minded. Experience shows that many a pupil who is a wretched failure in the study of books is a brilliant success in the application of scientific principles to the molding of materials.

CHAPTER

GENERAL STATISTICS FOR

TABLE

STATISTICS OF SECONDARY SCHOOLS

SCHOOL.	No. students entering college directly from highest class, fall of 1907.		No. entering higher institution other than college.	No. graduates June, 1907.	No. pupils admitted to full standing in the fall of 1908.		No. admitted on conditions.
	Upon examination.	By certificate.			Upon examination.	By certificate.	
Alton .....	1		1	5	20		3
Antrim .....		1		6	12		1
Atkinson .....	1	1	3	6	4		4
Austin-Cate .....		1		3	7		
Berlin .....	1			6	4	49	
Bethlehem .....				6	1	8	
Bristol, 2 years .....				3	13		
Claremont .....	1	5		17	3	52	
Coe's, Northwood .....				9	9	1	1
Colby .....	1	5		14	13	29	20
Colebrook .....		2	2	10	24	16	
Concord .....	3	11	7	57	15	141	
St. Mary's .....			1	3	10		
Dover .....	4	5		28	27	74	2
Dow .....	1			4	8		5
Epping .....			1	2	7		
Exeter, 3 years .....			3	12	26	2	1
Farmington .....				6	6	18	
Franklin .....		3	2	13	7	21	1
Gilmanton .....					8		
Goffstown .....		1	5	8	52	1	
Gorham .....				6	13	2	
Hampstead .....				5	15		
Hampton .....				5	4		
Hanover .....	1	4	2	9	18		1
Haverhill .....		1		2	31		
Henniker .....					25		
Hillsborough .....		1		4	17	1	
Hinsdale .....	1			9			
Holderness .....		3		4	17	7	
Hopkinton .....			3	12	11		2
Keene .....	1	2		22	16	68	3
Kimball Union .....	2	6	1	14	28	23	2
Laconia .....	1	10	1	22		60	1
Lancaster .....		3	1	11	30	1	
Lebanon .....		1		8	10	14	2
Lisbon .....		1		11	1	10	
Littleton .....	1	4		18	1	32	4
Manchester .....	3	7	7	79		169	
St. Anselm's .....	3	7		9	24		
Marlborough .....		1		7	43	9	
Meredith, 2 years .....			8	8	15		3
McGay .....				2	18		
Milford .....		4		20	2	18	
Milton .....				10	19		2
Nashua .....	5	8	4	47	115		
New Boston .....		2	1	6	7	2	
New Hampton .....	1	4	2	22	29	11	

## IV.

## SECONDARY SCHOOLS.

No. 38.

FOR YEAR ENDING JULY 15, 1908.

No. admitted to advanced standing from other secondary schools.	No. promoted to full standing in studies of second year at close of school year.	To full standing in third year.	To full standing in fourth year.	To full standing in fifth year.	No. in full standing in the highest class granted diplomas at close of school year.	No. first year pupils failed of promotion wholly or in part at close of school year.	No. second year pupils.	No. third year pupils.	No. fourth year pupils.
2	9	.....	7	.....	4	.....	.....	3	4
.....	10	15	3	.....	4	.....	1	.....	.....
.....	3	.....	.....	.....	3	.....	.....	1	.....
2	38	3	6	.....	17	.....	.....	.....	.....
.....	29	17	20	.....	22	19	20	7	.....
.....	7	5	1	.....	6	1	2	1	.....
1	6	3	.....	.....	.....	.....	.....	.....	.....
6	30	18	23	.....	25	14	14	11	.....
.....	7	6	5	.....	6	2	.....	1	.....
21	17	8	12	.....	24	2	9	3	4
3	10	14	11	.....	15	12	4	.....	.....
6	77	54	50	.....	54	65	28	15	.....
.....	2	6	.....	.....	1	.....	.....	.....	.....
7	76	56	51	.....	50	13	8	3	.....
2	2	.....	.....	.....	2	7	3	.....	.....
.....	6	1	3	3	3	1	.....	2	.....
2	16	9	15	.....	15	6	2	1	.....
1	18	12	7	.....	9	3	3	.....	.....
7	14	20	13	11	21	7	18	12	4
1	2	4	1	.....	4	3	1	1	.....
1	14	9	8	.....	7	5	3	1	8
.....	4	5	6	.....	6	8	1	.....	.....
.....	5	6	2	.....	.....	2	.....	.....	.....
2	4	5	3	.....	11	11	7	.....	.....
2	13	6	14	.....	9	6	5	2	.....
.....	4	3	3	.....	4	8	4	2	.....
2	10	2	2	.....	7	1	.....	1	.....
1	6	8	3	.....	4	7	3	.....	.....
.....	9	2	6	9	9	1	.....	2	.....
7	10	8	9	9	7	3	2	.....	1
.....	9	9	.....	.....	3	1	.....	1	.....
6	49	46	27	.....	33	22	19	6	2
20	22	15	23	.....	15	14	3	5	.....
7	32	19	33	.....	34	16	12	2	.....
.....	25	16	14	.....	10	5	3	1	.....
2	19	18	16	.....	24	4	7	2	.....
.....	5	3	3	.....	5	6	4	2	2
1	23	22	12	16	9	11	3	4	3
3	147	89	94	.....	103	29	41	13	3
9	16	7	12	.....	5	8	2	2	3
.....	3	9	2	.....	16	4	3	3	.....
1	9	.....	.....	.....	6	1	.....	.....	.....
.....	16	8	2	.....	7	1	1	3	.....
1	16	23	24	.....	26	10	16	2	1
.....	12	6	15	.....	15	1	3	4	.....
3	86	93	63	.....	47	8	2	1	.....
1	7	1	2	.....	6	.....	.....	1	.....
*	*	*	*	.....	10	.....	.....	.....	.....

\*Not strictly classified.

†Many were taking only partial courses, and some passed in all subjects they were carrying.



TABLE No. 38.

SCHOOL.	No. students entering college directly from highest class, fall of 1907.		No. entering higher institution other than college.	No. graduates June, 1907.	No. pupils admitted to full standing in the fall of 1908.		No. admitted on conditions.
	Upon examination.	By certificate.			Upon examination.	By certificate.	
New Ipswich.....	1	.....	.....	.....	15	1	.....
Newmarket.....	1	.....	6	11	3	10	2
Newport.....	.....	2	2	14	4	10	.....
Pembroke.....	.....	.....	2	9	5	13	2
Penacook.....	.....	.....	.....	.....	2	15	.....
Peterborough.....	1	2	1	9	5	21	.....
Pinkerton.....	.....	4	.....	15	17	11	22
Pittsfield.....	.....	.....	.....	8	2	20	1
Plymouth.....	1	2	5	12	19	28	2
Portsmouth.....	1	3	5	49	45	72	1
Proctor.....	1	.....	.....	4	12	.....	.....
Robinson.....	.....	3	5	12	5	4	.....
Rochester.....	.....	8	4	30	2	61	.....
Sanborn.....	.....	6	1	22	72	7	5
Somersworth.....	.....	4	11	26	.....	25	7
Stratford.....	2	.....	.....	5	2	12	.....
Tilton.....	7	8	10	41	25	71	.....
Troy, 1 year.....	.....	.....	.....	4	10	.....	1
Walpole.....	.....	.....	.....	5	.....	22	10
Warner.....	.....	.....	.....	7	19	1	7
Whitefield.....	1	1	1	8	1	12	1
Wilton.....	.....	.....	.....	4	.....	16	1
Winchester.....	.....	2	.....	7	9	1	2
Woodsville.....	.....	2	.....	8	2	14	2

—Continued.

No. admitted to advanced standing from other secondary schools.	No. promoted to full standing in studies of second year at close of school year.	To full standing in third year.	To full standing in fourth year.	To full standing in fifth year.	No. in full standing in the highest class granted diplomas at close of school year.	No. first year pupils failed of promotion wholly or in part at close of school year.	No. second year pupils.	No. third year pupils.	No. fourth year pupils.
1	4	7	1			9	1	3	
2	9	4	4	13	6	3		2	1
1	15	12	10		9	3	3	7	
	11	10	15		7	1			
	11	10	8		9	6	3	3	
	9	11	10		10		1	1	1
7	29	30	15		16	29	10	5	
	9	3	8		8	11	3	1	
4	35	13	19		14	34	13	5	
2	54	37	30		39	35	30	9	2
	14	10	9		6	3		2	
4	34	28	21	22	24	4	8	1	3
2	53	25	22		34	9	10	4	1
8	18	15	13		12	12	6	6	
2	21	15	11		22	12	2	1	
2	17	3	4		4	2	1		
	52	57	63		55	10	9	8	3
2	10				10				
	8	4	3		3	2	6	1	
	4	10	13		10	8	4	4	
1	5	6	7		10		7	2	
	8	11	1		6	3			
	10	6	5		6	3			
	10	10	10		6	8	4		2

TABLE No. 38.

SCHOOL.	Whole number of different pupils registered during year.	No. attending at least two weeks.		No. over sixteen years of age.	No. between five and sixteen.	Average attendance.	Average absence.	Average membership.
		Boys.	Girls.					
Alton .....	40	18	22	7	33	33	7	40
Antrim .....	35	12	23	20	15	32	1	33
Atkinson.....	25	10	13	7	16	18	1	19
Austin-Cate .....	39	16	23	22	17	36	3	39
Berlin .....	166	87	79	86	80	138	7	145
Bethlehem .....	26	13	13	17	9	22	1	23
Bristol, 2 years.....	14	8	6	13	1	10	.....	10
Claremont .....	153	72	80	87	66	135	4	139
Coe's, Northwood.....	31	17	13	23	8	25	2	27
Colby .....	132	75	56	104	28	.....	.....	.....
Colebrook .....	80	33	47	40	40	72	3	75
Concord.....	386	172	214	212	174	346	16	362
St. Mary's.....	19	.....	19	14	5	5	1	6
Dover.....	289	135	154	118	171	259	13	272
Dow .....	19	10	9	16	3	16	1	17
Epping .....	22	11	11	16	6	20	1	21
Exeter, 3 years.....	59	59	.....	26	33	51	1	52
Farmington.....	58	33	25	25	33	51	3	54
Franklin.....	136	50	85	70	66	122	5	127
Gilmanton.....	22	9	13	10	12	16	1	17
Goffstown.....	53	27	26	17	36	42	1	43
Gorham .....	36	15	21	14	22	32	1	33
Hampstead.....	24	6	18	7	17	16	1	17
Hampton.....	55	29	26	23	32	43	2	45
Hanover.....	80	31	49	41	39	69	5	74
Haverhill.....	31	14	17	16	15	26	2	28
Henniker.....	25	6	19	15	11	24	1	25
Hillsborough.....	41	19	22	10	31	34	2	36
Hinsdale.....	39	14	24	19	20	34	2	36
Holderness .....	62	62	.....	39	23	55	.....	55
Hopkinton.....	40	17	18	15	20	35	2	37
Keene.....	231	87	144	125	106	201	9	210
Kimball Union.....	131	82	48	93	37	116	8	124
Laconia .....	181	77	100	99	82	160	4	164
Lancaster .....	94	36	58	40	54	84	2	86
Lebanon .....	102	46	56	67	35	91	4	95
Lisbon.....	36	12	24	19	17	31	2	33
Littleton.....	131	61	68	69	60	113	5	118
Manchester .....	547	242	305	267	280	508	21	529
St. Anselm's.....	67	64	.....	48	16	62	2	64
Marlborough.....	43	23	19	21	21	38	4	42
Meredith, 2 years.....	23	13	10	12	11	18	1	19
McGaw .....	44	22	22	17	28	36	3	39
Milford.....	134	70	63	104	30	118	4	122
Milton.....	60	24	36	26	34	53	2	55
Nashua.....	334	138	196	179	155	303	14	317
New Boston.....	19	5	13	10	7	15	1	16
New Hampton.....	120	79	41	98	22	.....	.....	.....

—Continued.

Per cent. of attendance.	No. pupils not absent nor tardy.	No. cases of tardiness.	Average number tardinesses per pupil.	Rates of tuition per annum.	No. men teachers.	Annual salary of head master.	Average annual salary of sub-masters.	No. women teachers.	Average annual salary of women teachers.
83	3	47	1.2		1	\$650.00		1	\$360.00
96	18	100	2.9	\$30.00	1	900.00		1	360.00
93	2	66	2.3	27.00	1	867.50		1	410.00
93	71	71	1.8	24.00	1	700.00		1	450.00
96	6	454	2.7	38.00	3	1,000.00	\$825.00	4	656.00
93	1	401	15.4	35.00	1	900.00		2	363.75
97	2	1	0.7					1	540.00
97	14	427	2.8	36.00	2	1,600.00	600.00	5	590.00
93	2	287	10.6	30.00	2	1,200.00	800.00	1	475.00
	2			40.00	4	2,000.00	816.67	5	650.00
97	19	303	3.8	30.00	1	1,200.00		2	500.00
93	31	847	2.2	45.00	2	2,000.00	1,000.00	13	765.38
83		24	3.4	75.00					
95	45	238	0.8	40.00	2	1,700.00	1,000.00	8	631.25
92	1	222	11.7	30.00	1	650.00		1	450.00
94	2	123	5.6	27.00	1	750.00		1	400.00
98	10	132	2.2	30.00	1	1,400.00		1	500.00
95		152	2.6	20.00	1	1,200.00		2	475.00
96	11	168	1.2	35.00	1	1,500.00		4	562.50
96	3	65	3.0	36.00	1	700.00		1	450.00
98	40	95	1.8	16.20	1	750.00		2	390.00
98	7	45	1.3	30.00				3	350.00
94	4	45	1.8		1	750.00		1	360.00
96	20	14	0.5	24.00	1	800.00		2	375.00
93	1	209	2.8	24.00	3	1,000.00		3	600.00
94		206	6.6	25.00	1	862.00		1	360.00
96	6	46	1.8	30.00	1	800.00		1	380.00
95	1	121	2.9	12.00	1	1,000.00		*2	395.00
94	2	81	2.3	6.00	1	1,150.00		2	525.00
				75.00	6	1,500.00	675.00		
94	3	202	5.0	30.00	1	1,000.00		1	360.00
95	10	171	0.8	30.00	2	1,600.00	800.00	7	625.00
93	7			40.00	5	1,250.00	800.00	4	625.00
97	7	131	0.7	38.00	3	1,200.00	600.00	4	600.00
97	6	199	2.1	36.00	2	1,500.00	950.00	2	700.00
96	6	619	6.5	40.00	1	1,400.00		*5	440.00
93	2	166	5.0	36.00	1	1,400.00		2	600.00
96	9	399	3.0	38.00				5	650.00
96	49	1,551	2.8	32.30	5	2,200.00	1,275.00	12	775.00
97	42	20	0.8	40.00 to 60.00	14				
92	6	337	8.3	18.00	1	700.00		1	400.00
96	1	156	6.8	26.25	1	700.00			
92	2	207	4.7	36.00	1			1	400.00
97	15	237	1.8	36.00	1	1,200.00		5	521.20
97	3	89	1.3	18.00	1	1,400.00		2	575.00
96	23	1,434	4.2	40.00	3	1,700.00	900.00	12	700.00
93	1	156	8.2	24.00	1	800.00		1	340.00
				40.00	4	1,000.00	700.00	†6	550.00

\* One on half time.

† Three for tuition.

TABLE No. 38.

SCHOOL.	Whole number of different pupils registered during year.	No. attending at least two weeks.		No. over sixteen years of age.	No. between five and sixteen.	Average attendance.	Average absence.	Average membership.
		Boys.	Girls.					
New Ipswich.....	32	15	17	14	18	26	2	28
Newmarket.....	48	18	30	23	25	42	3	44
Newport.....	59	28	31	52	7	52	3	55
Pembroke.....	58	24	34	44	14	49	4	53
Penacook.....	57	28	29	24	33	51	2	53
Peterborough.....	65	27	38	43	22	56	3	59
Pinkerton.....	135	69	66	84	51			
Pittsfield.....	56	30	25	33	22	48	1	49
Plymouth.....	133	57	76	65	68	113	14	127
Portsmouth.....	313	142	171	167	146	269	8	277
Proctor.....	69	29	59	22	19	56	3	59
Robinson.....	164		164	65	99	160	5	165
Rochester.....	184	64	94	74	110	171	7	178
Sanborn.....	115	61	51	51	64	96	5	101
Somersworth.....	96	47	49	47	49	82	4	86
Stratford.....	42	14	28	24	18	36	3	39
Tilton.....	285	160	125	206	79			
Troy, 1 year.....	11	5	6	4	7	10		10
Walpole.....	32	8	24	12	20	27	1	28
Warner.....	74	34	40	34	40	68	4	72
Whitefield.....	57	25	31	30	26	46	2	49
Wilton.....	38	14	24	20	18	31	3	33
Winchester.....	37	17	20	15	21	31	2	33
Woodsville.....	57	33	24	42	15	49	3	52

—Continued.

Per cent. of attendance.	No. pupils not absent nor tardy.	No. cases of tardiness.	Average number tardinesses per pupil.	Rates of tuition per annum.	No. men teachers.	Annual salary of head master.	Average annual salary of sub-masters.	No. women teachers.	Average annual salary of women teachers.
93	2	16	0.5	\$30.00	1	\$1,100.00	.....	1	\$600.00
94	2	62	1.3	35.00	1	1,200.00	.....	2	500.00
95	.....	586	9.9	18.00	2	1,000.00	\$575.00	2	475.00
92	5	89	1.5	40.00	2	1,000.00	700.00	1	500.00
96	12	787	13.8	35.00	1	900.00	.....	2	432.00
94	12	184	2.9	30.00	1	1,200.00	.....	2	516.00
.....	.....	.....	.....	21.00	5	1,900.00	1,150.00	6	750.00
98	6	107	2.0	33.82	1	900.00	.....	2	487.50
89	.....	290	2.1	40.00	1	1,800.00	.....	5	640.00
97	66	222	1.1	50.00	5	1,600.00	875.00	6	650.00
95	2	79	1.3	36.00	1	1,000.00	.....	3	500.00
97	15	254	1.5	40.00	1	2,000.00	.....	7	710.00
96	6	981	5.3	40.00	3	1,350.00	625.00	4	631.00
96	12	588	5.8	15.00	2	2,000.00	1,000.00	5	600.00
95	6	60	0.1	24.00	1	1,400.00	.....	3	600.00
93	2	157	3.7	24.00	1	850.00	.....	1	500.00
.....	.....	.....	.....	51.00	5	2,500.00	1,250.00	9	666.00
96	1	1	0.1	30.00	.....	.....	.....	1	576.00
95	3	87	2.7	18.00	1	800.00	.....	1	340.00
94	.....	123	1.6	30.00	1	1,100.00	.....	2	475.00
95	4	176	3.1	27.00	1	1,100.00	.....	2	475.00
92	4	50	1.3	18.00	1	850.00	.....	2	400.00
95	1	71	1.9	30.00	.....	.....	.....	2	700.00
95	8	449	7.9	30.00	1	1,350.00	.....	2	450.00

## SUMMARY OF STATISTICS FOR SECONDARY SCHOOLS.

Number students entering college directly from highest class fall of 1907:	
Upon examination,	48
By certificate,	151
Number entering higher institutions other than college,	108
Number graduates June, 1907,	900
Number pupils admitted to full standing in the fall of 1908:	
Upon examination,	1,068
By certificate,	1,276
Number admitted on condition,	124
Number admitted to advanced standing from other secondary schools,	168
Number promoted to full standing in studies of second year at close of school year,	1,400
To full standing in third year,	1,029
To full standing in fourth year,	933
To full standing in fifth year,	83
Number in full standing in the highest class granted diplomas at close of school year,	1,048
Number first year pupils failed of promotion wholly or in part at close of school year,	554
Number second year pupils,	378
Number third year pupils,	186
Number fourth year pupils,	48
Whole number different pupils registered during year,	6,751
Number attending at least two weeks:	
Boys,	3,110
Girls,	3,584
Number over sixteen years of age,	3,638
Number between five and sixteen,	3,068
Average attendance,	5,333



Average absence,	257
Average membership,	5,590
Per cent. of attendance,	95
Number pupils not absent nor tardy,	584
Number cases of tardiness,	16,483
Average number tardinesses per pupil,	2.9
Average rate of tuition per annum,	\$32.10
Number men teachers,	129
Average annual salary of head master,	\$1,219.98
Average salary submasters,	\$870.41
Number women teachers,	215
Average annual salary of women teachers,	\$578.36

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## CHAPTER V.

### THE INFLUENCE OF SECONDARY SCHOOLS UPON MOVEMENTS OF POPULATION AND UPON VOCATION.

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In the past, it has seldom seemed necessary or even possible to take account of stock and find out just what effect our various social institutions are having upon society. In the case of schools we have believed that in general the effect is a good one, and probably few people could be persuaded that the effect of an institution could be measured. It could not be measured in its totality. It needs only investigation, however, to find out and measure some of the effects. The larger the number of the different effects which a given institution is exerting upon society we can understand and measure, the more precisely can we direct its efforts, the better results can we secure from that institution.

The secondary school, the high school and academy, of our state has had a very valuable effect upon the lives of thousands of individuals; of this there is no serious ques-

tion. We do not, however, support schools by taxation for the sake of the individual primarily, but for the sake of the community and of society. It is not quite so clear that our secondary schools have invariably helped to build up the life of the community, either state or local. I shall endeavor to show that whether a given school is likely to contribute to the welfare of the community which it serves or not depends very largely upon the kind of school it is.

Attention is called to the following table:

TABLE No. 39.  
SHOWING THE GEOGRAPHICAL AND VOCATIONAL DISTRIBUTION OF THE GRADUATES OF FIFTEEN  
TYPICAL SECONDARY SCHOOLS FROM FOUNDATION OF SCHOOLS DOWN TO AND INCLUDING 1900.

	Tilton.	New Hampton.	New London.	Concord.	Somersworth.	Pinkerton.	Warner.	Lisbon.	Lebanon.	Proctor.	Hillsborough.	Sanborn.	Nute.	Woodsville.	Dow.
Record dates from .....	1847	1854	1854	1860	1861	1869	1873	1881	1882	1884	1887	1890	1893	1897	..
Total graduates counted .....	585	505	534	900	291	90	114	117	110	71	41	82	44	11	75
Settled in home town .....	40	30	21	480	68	2	28	38	41	19	13	10	13	2	20
Per cent .....	7	6	4	53	23	2	25	32	37	27	32	12	29	18	27
Settled in home county .....	82	64	61	507	88	29	65	54	50	32	16	36	16	2	31
Per cent ..	14	12	11	56	30	32	57	46	45	45	39	44	36	18	41
Settled in New Hampshire .....	255	260	167	548	107	53	78	67	61	41	26	40	19	4	33
Per cent .....	44	51	31	61	37	59	68	58	55	58	63	49	46	36	44
Total boys .....	297	274	313	293	80	38	42	49	34	23	10	38	17	6	38
Boys in ind. and agricultural pursuits .....	30	33	12	33	8	8	10	13	1	..	..	8	4	..	..
Per cent .....	10	12	4	11	..	21	24	26	3	..	..	21	23	..	..

In the study represented by Table No. 39 the schools included were chosen wholly for the reason that the department was able to secure from them complete lists of graduates, including for the most part the vocations of the graduates. So far as possible it was aimed to include in the study only pupils born in New Hampshire. In the case of New Hampton, the admirably complete alumni record compiled by Principal Preston enabled this to be accurately done. In the cases of Tilton and New London, the only other schools drawing at all upon sources outside the state, pupils born in New Hampshire could not be distinguished from those coming in from abroad, and therefore the town, county and state items are somewhat but not much vitiated.

It should be said that these institutions are and have been practically of the same type, namely the familiar classics-mathematics secondary school.

It appears from the table that the fifteen schools concerned graduated between the dates of their foundations and 1900, inclusive, 3,570 pupils.

Of these 3,570 pupils, 825, or 23 per cent., remained in the home town and 1,133, or 32 per cent., in the home county of the institution. It will be noted that the academies have retained a much smaller percentage of their graduates in their immediate vicinity than the high schools; naturally enough since the constituency of the former is scattered, while that of the latter is practically confined to the home town.

Of the 3,570 graduates, 1759, or 49 per cent., remained in the state, while 51 per cent., or a majority, moved beyond the borders into other states or into foreign countries.

Now certain curious things appear in the table.

For instance, Concord and Somersworth have had high schools similar in type and for almost exactly the same length of time. Yet 53 per cent. of the Concord graduates have remained at home, while but 23 per cent. of the

Somersworth graduates have done so. The Somersworth percentage does not differ widely from the average of that of the six other strictly public high schools, namely 29 per cent.

Again, in 1877 New Hampton established a commercial department designed to afford an opportunity for those prospective students who sought something more directly connected with the needs of their daily life than the regular courses offered, and in 1881 the first class was graduated from this department. The effect of this new course upon distribution is seen at once from the following statement, in which the distribution of the whole list of graduates prior to 1881 is compared with that of the whole list of graduates since 1881.

	Per cent. before 1881.	Per cent. since 1881.
Settled in New Hampton,	4	8
Settled in Belknap County,	5	20
Settled in New Hampshire,	38	65
Boys,	48	60
Of the last in agricultural and mechanical pursuits,	9	15

Again: New London has maintained a commercial course and has published the names, addresses and vocations of its graduates. In the following statement, the distribution of the whole number of New London graduates is compared with that of the commercial department alone.

	General alumni list.	Commercial graduates alone.
Settled in New London, per cent.,	4	44
Settled in Merrimack County, per cent.,	11	52
Settled in New Hampshire, per cent.,	31	74
Boys,	58	78
Of the last in agricultural and mechanical pursuits, per cent.,	4	13

One effect of the introduction of these commercial courses appears clearly to have been to greatly increase the proportion of graduates who settle either in the home town or in the home county or in the home state.

How is it then that remarkable exceptions to the general practice of emigration after graduation are found in Concord, which had not at all varied in type from the other institutions, and in New London and New Hampton after commercial courses were introduced? It is evidently absurd to suppose that any home-loving qualities were directly developed by the courses pursued at the institutions in question.

The answer is without much doubt to be found by appeal to the principle of selection which has cleared up so many other problems in the study of organic life of all sorts. Stated briefly, as applied to the case under discussion, the principle would amount to this: (I) Those pupils will attend a given secondary school who believe that its courses will help them in that line of future activity in which they are interested and for which they are probably best fitted; others will tend either not to enter, or, having entered and failed to become interested, will tend to drop out early in the course. (II) Upon graduation, pupils will tend to seek localities in which the activities for which they have prepared themselves are to be found in their best estate. If such activities are to be found in abundance in the home town, the strong tendency will undoubtedly be to remain at home.

Now, the classics-mathematics type of high school leads naturally to the following activities of life chiefly: (*a*) to the college and thence to the learned professions, including teaching; (*b*) to commercial pursuits, particularly to the semi-professional sides of commerce, such as accounting and banking. It will be noted that of all the boys graduated in those institutions which have preserved the records of the employment of their graduates, less than eleven per



cent. entered any form of agricultural or mechanical pursuit.

Now most New Hampshire towns and cities furnish very little outlet for professional talent, but an outlet indefinitely large for agricultural and mechanical talent of all sorts. To exploit his professionally educated and professionally trained powers, the young man must seek the metropolis or at least the more thickly settled portions of the country. It is matter of common knowledge how largely New Hampshire and other states similarly situated have thus contributed to the leadership of the metropolitan cities.

On the other hand, commercial subjects and, still more, agricultural and mechanical subjects in the secondary school appealing to a class of pupils whose interests lie in these directions deliver their graduates to a group of activities for which there is ample opportunity at home or at least in the home state. Hence the commercial courses at New Hampton and New London could return a greatly increased ratio of graduates to the home state, county and town. Agricultural courses in these institutions would doubtless have had a still more marked effect in this direction.

Concord retains a percentage of her graduates in the home town, more than twice as high as the average retained. Why? Undoubtedly because the professional and commercial opportunity is relatively much higher in Concord than in any other town or city in the state, owing to its being the state capital and at the same time an important trading center. It will be noted that Concord's percentage in agriculture and the mechanical trades is one of the lowest. Somersworth on the other hand, which has maintained for about the same length of time a school of about the same type as Concord, has retained at home less than half as many graduates in proportion to the whole number graduating, and sixty-three per cent. have left the state.



Furthermore, the process of depopulation so far as it depends upon this factor has undoubtedly been accelerated by the fact that this sorting and selecting process has made heavy drafts upon the stock of persons of great native ability. They have led in other towns and other states. On the whole and as a class they would not have graduated had it not been for their native ability and their native persistency. Now, when one leader leaves a community, or fails to develop there, it means that several others who are not leaders must leave, since it takes leaders to create or maintain the economic conditions which are essential to employment.

Furthermore, in the long run this selective process must lower greatly the qualities of thrift and progressiveness which would otherwise characterize the community. No community can stand the steady drain of an agency which is annually causing the best material of each succeeding class of pupils to emigrate, leaving the relatively inferior behind, unless some compensating drift is set up by other agencies. After a few years, commercial and agricultural and industrial enterprise, the life of the church and of the school, will begin to flag for lack of energetic leadership and an energetic rank and file. A society which was formerly noted for its thrift, for its intelligence, for its progressive spirit, for its large minded devotion to good works, will begin to be noted for its shiftlessness, for its narrowness, for its prejudice, for its poor selfishness and indifference to the common aspirations as manifested by religion and by education.

Actually, this is just what has happened. During the first three-quarters of the nineteenth century, every group of three or four towns had its academy, usually an endowed institution. Out of these academies went a steady stream of sons and daughters who were, other things being equal, always the strongest of the generation, for otherwise they would not have gained this education. Seldom did

they settle upon the old farm or in the home town. Their education had fitted them for other things. They became lawyers, or physicians, or clergymen, or schoolmasters, or business men in the cities, and the girls went with them prevailingly to be their wives. Their children grew up under city conditions and went to city schools. The unambitious, the dull, the unfortunate boys and girls of the old countryside, who could not get to the academy, as a class remained behind and became the dominant stock. And they reproduced their kind for another generation, upon whom the same sorting process was carried out. Then the factory system seized upon the strong-limbed and restless, albeit slow witted, and began to sort them out and remove them. Finally, the civil war came and struck down the idealists by the wholesale, mostly boys or young men who had not yet reproduced themselves in a new generation. Now, upon a journey through rural New England, you shall see fine old mansions showing by their architecture that they date back well toward the beginning of the nineteenth century, and ample old homesteads with their capacious barns, all of them more or less in a state of decay. Of many, nothing but the cellar hole and an, at first sight, unaccountable orchard is left. These were the homes of a race which lived and prospered, which cleared the land and built homes and added barn to barn, which accumulated wealth and gave virile expression of itself in church, in state and in educational institutions. And yet the nearest market was often fifty miles away by wagon road. The nearest metropolitan market was often as distant as is the metropolis of the world to-day. But that race allowed its sons and daughters to be educated away from the farm and the country and from the state. In their place to-day, we too often have a dwindling town, a neglected farm, a closed church, an abandoned schoolhouse. And, if the last two are still open, in too many cases the cause of religion and of education would be better served

were they closed. And the old academy, having sorted out and sent away the ambitious stock, is now dormant.

The tendency of this phase of depopulation has been to strip the rural town in favor of the village town, to draw from the village town into the city, and to draw from the whole state into those states having already thickly settled areas. Accordingly, our New Hampshire rural towns as a class have lost from twenty to fifty per cent. in the last fifty years, and had it not been for the influx of the foreign factory population the state as a whole would probably have lost.

The selective process and the purely classics type of secondary school have undoubtedly also been responsible within the urban zone for heavy drafts of native power and adaptability away from the industries and trades toward the professions and toward commercial life; and, what is worse, has probably been responsible in much the same way for a considerable part of the drift of women away from motherhood and home-making into economic competition with men.

I shall propose in the next chapter what seem to me to be the obvious remedies.

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## CHAPTER VI.

### EDUCATING TOWARD AGRICULTURE AND THE INDUSTRIES.

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Perhaps the most prominent popular discussion of education which has taken place within the past few years has been that included within the term, Industrial Education. Business men and statesmen have come to see that as a nation we are losing ground for the lack of efficient foremen and workers in competition with nations which are

making great expenditures upon the process of training the masses for industrial efficiency. Several states have appointed industrial commissions to study the problem, and some commissions, notably that of Massachusetts, have made illuminating reports. It seems to have been demonstrated that we need a larger proportion of producers, a better trained class of workmen, a better trained class of foremen and superintendents, and a class of original investigators better adapted to the discovery and practical application of scientific principles.

The problem has as its fundamental condition the principle that in a democratic society you must still leave every individual with the maximum freedom to seek the industrial level most consistent with his native powers. The problem is thus widely different than that of a society in which there is a strong presumption that every child will remain at the industrial level of his parent and probably follow the same vocation as the parent.

The solution most obvious to the layman in education is the construction of technical or trade schools which will secure the child as early as possible and train him for a specific calling, or rather for a specific part of a specific calling. There are two serious objections to so simple a solution: First, you must catch your child, who, it must always be remembered, has as much right to aspire to be a lawyer as to aspire to be a competent mechanic; and, second, if you begin to develop skill at an early age you destroy adaptability, which is only another word for intelligence and directive capacity, and you perpetuate one of the worst features of the present factory system, that is to say, its tendency to turn men into machines.

Whatever need there may be of technical trade schools, the fundamental necessity is that we so modify our existing educational scheme that it will select the strongest of each generation as much for agriculture and for the industries as for the professions. We must educate toward

the farm and toward the industries before we train in agriculture and in the industries. Our present high school course says to the boy, "Aspire to earn your living with your brains rather than with your hands;" to the girl, "Fit yourself to be something more than a housekeeper, so that you may have happiness in spite of the drudgery of making a home." Instead, the unspoken message of our school must be: "Manual work is as desirable as brain work, provided you can learn to make brain and hands work together;" "Housekeeping can be as much a profession as medicine or teaching school;" "You must get happiness in your work instead of in spite of your work."

It has sometimes been said that we educate too much, that there must always be some uneducated and unintelligent to do the hard manual work if society is to be held together. Such a position is impossible of realization in America, unless our traditional institutions are to be torn up by the roots. Its fallacy lies in the belief long discredited by students of education that the only culture is the culture of books. He is as truly uneducated who does not know how to use his hands to useful purpose as is he who is unacquainted with the world of books. We are rapidly approaching a time when the great mass of American children will pass through the secondary school and a large percentage through college as well. If our higher education remains essentially bookish we shall evidently want for people to do the "hard manual labor." If we make our higher education practical as well as bookish, if from the grammar school up we educate through the use of agriculture and the mechanic and domestic arts, then we shall have no lack of means to perform the tasks now accomplished by unskilled labor, but our laborer will be a truly educated man, really the equal, as he is now theoretically the equal, of the scholar.

A country high school or academy having at least one curriculum devoted to agriculture will begin to turn the

drift of the able and the progressive of each generation back toward the farm instead of toward the city. Our city high school with one mechanic arts or textile arts curriculum will begin to turn the able and the intelligent of each class toward the shop and the factory instead of exclusively toward the office.

The following table shows proposed feasible curricula for all our high schools and academies. The program or course of study might be made up by using any one or any group of these curricula.



TABLE No. 40.

## SUGGESTED SECONDARY SCHOOL CURRICULA.

I.			II.		
<i>Regular college-preparatory, leading toward professional life.</i>			<i>Agricultural, leading toward a farm life, or toward further agricultural study.</i>		
Year.	Subject.	Hours per week.	Year.	Subject.	Hours per week.
I.	English,	5	I.	English,	5
	Algebra,	5		Algebra,	5
	History,	5		Biology Animal life, }	5
	Latin,	5		Plant life, }	5
				Farm bookkeeping, }	5
				Business practice, }	5
II.	English,	5	II.	English,	5
	Geometry,	5		Geometry,	5
	Modern language,	5		Physics,	5
	Latin,	5		Horticulture, }	5
				Agriculture, }	5
III.	English,	5	III.	English,	5
	Physics,	5		Chemistry,	5
	Modern language,	5		Comparative physiol- }	5
	Latin,	5		ogy and anatomy, }	5
				Rural engineering, }	5
				Modern language,	5
IV.	English,	4	IV.	English,	4
	Mathematics reviewed,	4		American constitutional }	4
	Modern language,	4		history,	4
	Latin,	4		Modern language,	4
	American constitutional }	4		Rural economy and }	4
	history,	4		farm management,	4
				Animal husbandry and }	4
				dairying,	4



III.

*Mechanic arts, leading to industrial life, or toward technological school.*

Year.	Subject.	Hours per week.
I.	English,	5
	Algebra,	5
	Bookkeeping, one-half year,	5
	Mechanical drawing,	5
	Carpentry, }	10
	Joinery, }	
	Carving, }	
II.	English,	5
	Modern language,	5
	Geometry,	5
	Mechanical drawing,	5
	Turning, pattern-mak- ing, molding and casting,	10
III.	English,	5
	Modern language,	5
	Physics,	5
	Mechanical drawing,	5
	Forging, }	10
	Machine tools, }	
IV.	English,	4
	Modern language,	4
	American constitutional history,	4
	Mechanical drawing,	4
	Chemistry,	4
	Tool making,	10
	Machine-shop prac- tice,	

IV.

*Domestic arts, leading to home making, or to higher schools of domestic economy.*

Year.	Subject.	Hours per week.
I.	English,	5
	History,	5
	Biology Animal life, }	5
	Plant life, }	
	Drawing and princi- ples of household art,	5
	Music,	
II.	English,	5
	Music,	5
	Designing, sewing and millinery,	
	Physics,	5
	Modern language,	5
III.	English,	5
	Modern language,	5
	Chemistry,	5
	Music, }	5
	History of art, }	
IV.	English,	4
	Modern language,	4
	Constitutional United States history,	4
	General physiology,	4
	Household hygiene and sanitation,	
	Nursing,	4
	Cooking, including dietetics and mar- keting,	
	Music (optional),	4

Any high school, large or small, the management of which aims to meet the needs of the community could well make up its program by choosing two or more of these curricula. A country school would choose I, II, and IV; a village or city school, I, III, IV. If the management should not care to offer preparation for the classical type of college, Curriculum I might be left out.

#### COST OF NEW HIGH SCHOOL PROGRAM.

Curriculum No. I is now in general use and consequently no estimates of cost need be given.

#### AGRICULTURAL CURRICULUM.

1. *Equipment.* The laboratories would not cost more than those now in use in the approved high schools. Indeed, no new laboratories would be needed. Eventually, some land would be needed for demonstration purposes and some greenhouse construction would be needed. In most places a small plot of land near the school could be rented, if there is not one already belonging to the school. The greenhouse could usually be heated from the schoolhouse plant, and would cost anywhere from two or three hundred dollars up according to needs and tastes. In some schools in other states the boys have built their own greenhouses.

The total cost of equipment for the average New Hampshire rural high school may be placed at \$500 exclusive of land. But it should be understood that such equipment would not all of it be required at once.

2. *Operation.* The cost of operating the plant ought to be met by sales of the products. One of the chief ends of such a course being to convince boys that farming can be made to pay, the greenhouse and any land which the school has under operation should emphatically be upon a self-supporting basis, so far as fertilizing materials, seed, heat for greenhouse, etc., are concerned.

The cost of teaching need not be very different from that in the present school. In a school now running on a two- or three-teacher basis, it would probably be best to have the proposed agricultural courses taught by the principal who must of course be a trained agriculturalist, a graduate or post-graduate of a regular agricultural college. In this case, so far as the agricultural curriculum is concerned, the cost of teaching would not therefore be different from that now incurred. In case the domestic arts curriculum should be added, one of the present assistants would simply be replaced with a graduate in domestic economy.

#### MECHANIC ARTS CURRICULUM.

The mechanic arts curriculum should of course be installed only in cities and large towns having a large trades and industrial equipment. A mechanic arts equipment in a rural town would tend to depopulate the community as quickly as the college preparatory curriculum has often done. The cost is here based upon that already found for a school enrolling forty boys in this curriculum.

##### 1. *Equipment.*

Engine lathe,	\$350.00
Milling machine,	350.00
Motor, shafting, etc.,	175.00
8 wood-working benches,	100.00
Wood-working tools,	200.00
4 wood lathes and tools,	250.00
Grinder,	40.00
Tool room supplies,	50.00
Forge room outfit,	200.00
Drawing outfit,	120.00
Upright drill,	75.00
	<hr/>
	\$1,910.00

The above represents what is believed to be a liberal estimate for the minimum equipment. Not all of this need be purchased at once. A good distribution of cost would be the following:

First year: Drafting outfits, carpenters' benches and tools, and accessories,	\$510.00
Second year: Wood lathes, motor and shafting and accessories,	425.00
Third year: Forges, anvils, machinists' benches, engine lathe, and accessories,	550.00
Fourth year: Milling machine, upright drill and accessories,	425.00
	<hr/>
	\$1,910.00

Of course the addition of other pieces from year to year would be desirable and the duplication of the pieces listed would enable work to be done to better advantage.

No estimates can be given for cost of fitting up room. Often high schools in this state are housed in buildings which have a basement suitable for the purpose. In the school referred to, Berlin, an extension to the basement for this purpose cost \$1,200. See cut. Figure 5.

2. *Operation.* The cost of operation would include power, which may be set at \$75, although it would vary considerably from that figure; lumber and other supplies, estimated at \$7.50 per pupil; repairs and replacements, estimated at ten per cent.

The teacher's salary in most of our high schools would cost from \$1,000 to \$1,500, but in most of our schools the mechanic arts instructor would also teach science or mathematics for a time and consequently the salary of a regular teacher, \$400 to \$600 must be set off against the mechanic arts teacher's salary, making the latter amount to from \$400 to \$1,100 net.

## DOMESTIC ARTS.

1. *Equipment.* It is impossible to estimate with any approach to precision what would be the cost of installing courses in domestic arts. There is no experience under our conditions to guide us and the per capita cost would probably be widely different in different communities. Without musical instruments, such as pianos, the total cost of equipment would probably fall within \$300.

Opportunities for instruction in instrumental music are, however, it seems to me, exceedingly desirable in such a curriculum. There are two attitudes toward this phase of musical education, between which I do not venture to decide. One party would have musical education consist essentially in the pupils learning to play upon the instrument. The other believes that the musical education of the non-professional comes rather from the cultivation of musical taste by listening to the skilful rendering of classics. For the former conception as applied to our domestic arts curriculum, we should need several good pianos. For the latter, a single pianola or first-class phonograph would amply suffice. The latter would probably require the more cultivated teacher.

Of course vocal music would need little outlay beyond that required for the instructor.

The curricula outlined above indicate only in a general way the scheme of the agricultural, mechanic arts, and domestic arts courses. Instead of describing here just what the pupils would do in the several courses, the reader is referred to the following chapter in which an account is given of what has been done in the past year.

It ought to be borne in mind that the legitimate purpose of such high school courses as these are not primarily to make good farmers, or skilled mechanics, or professional housekeepers. Their primary legitimate object is the education of the boy and girl to become a sincere and efficient

and happy man and woman, capable of becoming an educated worker with material things, capable of getting life's happiness out of work rather than out of the leisure which comes after work, if indeed it comes at all. A further primary legitimate purpose is to educate the strongest youth toward the farm and the industries, instead of toward the professions and business exclusively. For these ends the courses utilize agriculture and the mechanic and domestic arts purely as educational material absolutely on a par with Greek, Latin and mathematics. To become thoroughly efficient, the youth must still receive the training of specific technical instruction or of experience. But, the pupil who has had four years of the kind of instruction recommended will not only be a better educated man, but a more intelligent and more efficient farmer, or mechanic, or housekeeper.

The emphasis intended in these courses is that they shall train the youth to aspire not only to be good, but to be good for something.

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## CHAPTER VII.

### WORK IN SECONDARY SCHOOLS HAVING INDUSTRIAL COURSES.

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Five of our secondary schools have regularly approved curricula in one or more of the branches: Mechanic arts, agriculture, and the domestic arts. These are Berlin, Concord and Lebanon High Schools, Gilmanton and Coe's Academies. The agricultural curriculum at Lebanon, approved in 1906, has thus far failed to attract any considerable number of pupils, and that at Coe's Academy has been

in operation but one year, not long enough to show any results or to justify any conclusions, but long enough for encouraging promise. Reports from these other schools are given at some length in order to place them before school boards and boards of trustees interested in similar developments.

#### BERLIN—MECHANIC ARTS.

The manual work in Berlin follows a well regulated course, beginning in the elementary schools. Work in the secondary school alone is here reported upon.



TABLE No. 41.

## PROGRAM OF STUDY—BERLIN HIGH SCHOOL.

CURRICULUM I.			CURRICULUM II.			CURRICULUM III.		
Year.	Subject.	Periods per week. Extent.	Subject.	Periods per week. Extent.	Subject.	Periods per week. Extent.	Subject.	Periods per week. Extent.
I.	Latin,	5 1 yr.	Algebra,	5 5	Algebra,	5 1 yr.	Algebra,	5 1 yr.
	English,	5 1 yr.	English,	5 1 yr.	English,	5 1 yr.	English,	5 1 yr.
	History,	5 1 yr.	Bookkeeping,	10 1 yr.	Bookkeeping,	10 1 yr.	Bookkeeping,	10 1 yr.
			Drawing,	5 1/2 yr.	Drawing,	5 1/2 yr.	Drawing,	5 1 yr.
			Commercial Arithmetic,	5 1/2 yr.	Wood-working: Carpen-		Wood-working: Carpen-	
			Penmanship,	1 1 yr.	try, Joinery, Wood-		try, Joinery, Wood-	
					carving,	10 1 yr.	carving,	10 1 yr.
II.	English,	5 1 yr.	English,	5 5	English,	5 1 yr.	English,	5 1 yr.
	French,	5 1 yr.	French,	5 5	French,	5 1 yr.	French,	5 1 yr.
	Geometry,	5 1 yr.	Geometry,	5 1 yr.	Geometry,	5 1 yr.	Geometry,	5 1 yr.
	Latin,	5 1 yr.	Bookkeeping,		Drawing,	5 1 yr.	Drawing,	5 1 yr.
			Office Practice,	10 1 yr.	Wood-working: Wood-		Wood-working: Wood-	
			Typewriting,		turning, Pattern-mak-		turning, Pattern-mak-	
					ing, Moulding, and	10 1 yr.	ing, Moulding, and	10 1 yr.
III.	English,	5 1 yr.	English,	5 5	English,	5 1 yr.	English,	5 1 yr.
	French,	5 1 yr.	French,	5 5	French,	5 1 yr.	French,	5 1 yr.
	Physics,	5 1 yr.	Physics or Chemistry,	5 1 yr.	Physics,	5 1 yr.	Physics,	5 1 yr.
	Latin,	5 1 yr.	History of Commerce,	5 1/2 yr.	Drawing,	5 1 yr.	Drawing,	5 1 yr.
			Political Economy,	5 1/2 yr.	Metal Working, Forging,		Metal Working, Forging,	
			Stenography and type-	5 1/2 yr.	Machine Tools,	10 1 yr.	Machine Tools,	10 1 yr.
			writing,					
IV.	English,	4 1 yr.	English,	4 4	English,	4 1 yr.	English,	4 1 yr.
	French,	4 1 yr.	French,	4 4	French,	4 1 yr.	French,	4 1 yr.
	Review Mathematics,	4 1 yr.	Review Mathematics,	4 1/2 yr.	American History and		American History and	
	American History and		American History and		Civil Government,	4 1 yr.	Civil Government,	4 1 yr.
	Civil Government,	4 1 yr.	Civil Government,	4 1 yr.	Drawing,	4 1 yr.	Drawing,	4 1 yr.
	Latin,	4 1 yr.	Commercial Law,	4 1/2 yr.	Chemistry,	4 1 yr.	Chemistry,	4 1 yr.
			Stenography and Office		Metal Working: Tool-		Metal Working: Tool-	
			Work for Stenographer,	4 1/2 yr.	making, Machine-shop		making, Machine-shop	
			Banking and Finance,	4 1 yr.	Practice,	10 1 yr.	Practice,	10 1 yr.

The pupil entering the high school thus has a choice of a regular college-preparatory course leading to the classical college; of a mechanic arts course, giving a good general foundation for an industrial life and also leading to similar courses at institutions like the Massachusetts Institute of Technology or the New Hampshire College at Durham; and a commercial course designed to prepare for a commercial life. The work of the college preparatory and commercial courses is reported in the tables of Chapter III of this part of the report.

#### WORK IN MECHANIC ARTS FOR SCHOOL YEAR 1907-1908.

*Mechanical drawing* is taught in each of the four years and all construction is first sketched and then worked up into working drawings before being carried into the shop.

*First-year pupils.* Elementary cabinet-making. The use of hand tools, constructing tables, drawers, cabinets, drawing-boards, tee squares, plant stands, bookcases and other cabinet work as needed for use in the school. At the close of the year a few lessons in wood-turning to familiarize the pupils with the use of tools and lathe.

*Second-year pupils.* More advanced cabinet-making than first-year pupils could do. The models constructed are such as are needed in the school, notably: type cases, rule and lead cases for the print shop, all cabinet work in the physical and chemical laboratories of the new high school building, all finish in the addition devoted to mechanic arts, appliances for the shop, such as screw clamps, tool cabinets, etc., laboratory accessories, such as test tube holders, clamps, etc.—and numerous other articles. Of course this construction has involved such fundamental principles as the dovetail, mortise, tenon, etc.

Wood-turning, begun the first year, was carried on in the construction of articles such as towel rollers, chisel handles, bases for bill files, pen and ink sets; also in

the turning and threading of wood screws and similar appliances. In the process of constructing useful articles, the principles of wood-turning and the use of the lathe were taught.

The elements of pattern-making were taught, and the first lessons in forging were given.



FIG. 1.

Wood and Metal Working Room, Berlin High School.

*Third-year pupils.* Cabinet-making and wood-turning were continued as the needs of the school suggested.

Pattern-making. With skill in the use of hand tools and lathe came the possibility of purposeful pattern-making. Patterns of such things as pulleys, washers, collars were constructed, and finally a complete set for a speed lathe and the frame of a bench saw. "The problems involved in pattern-making," writes Superintendent Whiteher, "are among the most educative of all school activities. Will the pattern 'draw,' must it be cored, is the design one that is practical from the moulder's point of view? The first year's work with hand tools along straight lines and the

second year's work with the lathe and its curved lines came together in pattern-making to the great delight of the pupil."

Patterns were tested in sand in the shop and many of them taken to the local foundry, molded by the boys under the direction of the foundry foremen, after casting they were returned for lathing, milling, drilling, etc., and ended by being put to actual use as things of value.

Forging. Steel was worked into cold chisels, punches, lathe tools and the like. Iron links, rings for laboratory ringstands, bolts with heavy nuts for fastening work to the table of the milling machine, were the models constructed.

The engine lathe. Toward the close of the year, work upon the engine lathe was commenced, chiefly to familiarize the pupil with the fundamental principles of this "king among machinist's tools."

Not much chipping and filling is done because the day of hand work on iron, like hand moulding of wood, is past. The milling machine, shaper and planer do this work.

In making his report, Superintendent Whiteher makes the following observation upon the educational value of tempering as typical of the purely educational value of all this hand work. "To judge the right heat, to 'quench' just enough, to draw slowly but not too slowly, to discriminate tints in the film, to finally cool, yet not to wait until the metal is too soft,—these are fine problems for the mind to grapple with."

*Fourth-year pupils.* Forging and tempering all kinds of lathe tools and wood-working tools of special pattern. "To work good steel intelligently and accurately into well finished tools with a temper which will meet all the requirements of their particular use is a test of power which will tell a pretty true story."

The engine lathe was used in shaping castings and forgings, in making drill and reamer blanks, in boring and drilling.



The milling machine was used in finishing drills and reamers and in working all kinds of surfaces. It also made gear cutting possible.

Steam fitting. Pipe cutting, threading and making up

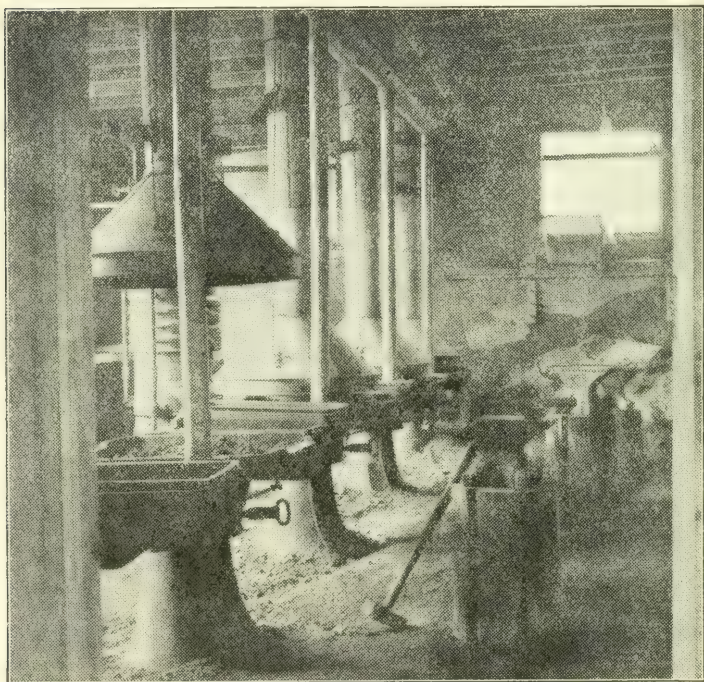


FIG. 2.

Forge Room, Berlin High School.

joints, was taught in a practical way. As one of the exercises, the boys with the assistance of their instructors installed the steam heating equipment of the mechanic arts addition to the high school building.

The mechanic arts work at the Berlin High School is discussed at length because it illustrates how much can be done without costly buildings and expensive machinery. So far as expense of installation is concerned, the same

could be done in every city and village in New Hampshire whose needs would warrant a mechanic arts course at all. The personal element would be hard to duplicate, for superintendents possessing the powers in this direction of George H. Whitcher are extremely rare.

## COST OF MECHANIC ARTS EQUIPMENT.

The addition to the high school basement shown in Figure 5 cost \$1,200. In many of the smaller high schools, basement room could be utilized at little cost.

Building,	\$1,200.00
8 wood-working benches,	\$100.00
Tools for wood-working,	200.00
4 wood lathes and tools,	250.00
Forge room outfit, 16 pupils,	200.00
Milling machine,	350.00
Engine lathe,	350.00
Grinder,	40.00
Motor shafting,	175.00
Tool room supplies,	50.00
Cost of equipment,	———— 1,715.00
<hr/>	
Cost of equipment and building,	\$2,915.00

## ANNUAL OPERATING EXPENSES.

Salaries,	\$1,150.00
Raw material,	250.00
Power,	50.00
<hr/>	
	\$1,450.00

Follows a list of useful construction actually made and actually in use, appraised at what is considered a fair valuation.

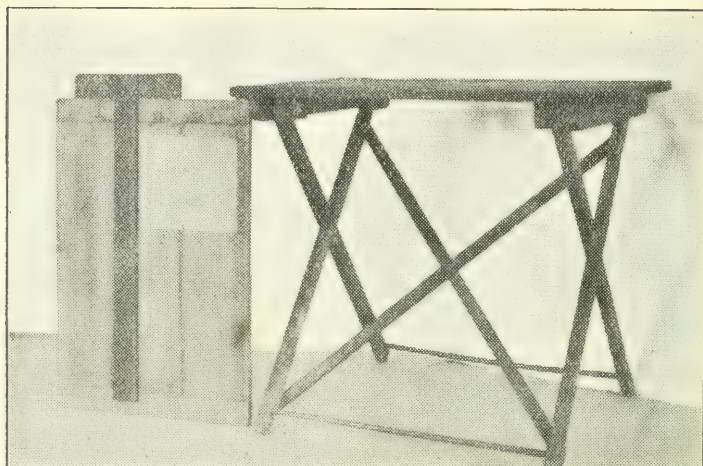


FIG. 3.

Drawing Table, Drawing Board and Tee Square. Forty sets of these were made for their own use by boys of Berlin High School.

40 drawing tables,	\$150.00
40 drawing boards,	50.00
40 tee squares,	50.00
1 drawing cabinet,	50.00
5 unit sectional bookcase,	10.00
2 card filing cases,	20.00
1 bill filing case,	10.00
10 typewriter tables,	50.00
Inside work in shop,	50.00
Inside work in laboratories,	100.00
10 desks for city council,	100.00
Sundry cabinets for drawings, print frames, etc.,	50.00
	<hr/>
	\$690.00

This construction does not include speed lathe and bench saw in process of construction.

It may be safely said, therefore, that in this school the cost of raw material has been considerably more than off-



set by the return in articles and furniture which otherwise must have been purchased.

The present equipment of the shop is sufficient for the minimum needs of sixty-four pupils in all classes. Of



FIG. 4.

Filing Cabinet made at Berlin High School.

course, the addition of another machine now and then will be made and the conveniences of teaching, as well as its efficiency, will thus be increased.

It should be understood that work was begun at Berlin in the fall of 1906 and that therefore it is only in its third year. Consequently no class has yet fully worked out the schedule contemplated by the course of study. Two classes have completed the regular work of the first year and one class the regular work of the first two years. The older boys have of necessity covered the ground as rapidly as circumstances would permit without much regard to the requirements of systematic grading.



FIG. 5.

Extension to Basement of Berlin High School, used as workshop.  
Floor of building several feet below grade shown.

Finally, it is stated by the superintendent that the shop is seldom without workers at 8 A. M., or vacated before 6 P. M., which, of course, means that interest is sufficient to cause boys to put in a great deal of voluntary time. Of all pupils promoted from the grammar schools of Berlin, June, 1908, one hundred per cent. entered the high school in September.

#### CONCORD—MECHANIC ARTS.

As in Berlin, the mechanic arts work of the high school has its foundation in a graded and systematic manual

training course in the elementary school. Work in the secondary school is here reported upon:

TABLE No. 42.

## PROGRAM OF STUDY—CONCORD HIGH SCHOOL.

CURRICULUM I.				CURRICULUM II.			
Year.	Subject.	Periods per week.	Extent.	Subject.	Periods per week.	Extent.	
I.	English,	5	1 yr.	English,	5	1 yr.	
	Ancient History,	5	1 yr.	Ancient History,	5	1 yr.	
	Algebra,	5	1 yr.	Algebra,	5	1 yr.	
	Latin,	5	1 yr.	Physiography,	5	1 yr.	
II.	English,	5	1 yr.	English,	5	1 yr.	
	Geometry,	5	1 yr.	Geometry,	5	1 yr.	
	Latin,	5	1 yr.	French,	5	1 yr.	
	Greek or French,	5	1 yr.	Biology or Medieval and Modern History,	5	1 yr.	
III.	English,	5	1 yr.	English,	5	1 yr.	
	Latin,	5	1 yr.	French,	5	1 yr.	
	Choose two:			Choose two:			
	{ Greek,	5	1 yr.	{ German,	5	1 yr.	
	{ French,	5	1 yr.	{ Physics,	5	1 yr.	
	{ German,	5	1 yr.	{ English History,	5	1 yr.	
	Physics,	5	1 yr.				
IV.	English,			English,	4	1 yr.	
	American History and	4	1 yr.	American History and			
	Civics,	4	1 yr.	Civics,	4	1 yr.	
	Latin,	5	1 yr.	Choose three:			
	Choose two:			{ French,	5	1 yr.	
	{ Greek,	5	1 yr.	{ German,	5	1 yr.	
	{ French,	5	1 yr.	{ Review Mathe-			
	Review Mathematics,	4	1 yr.	matics,	4	1 yr.	
	Advanced Mathematics,	4	1 yr.	{ Advanced Mathe-			
	Chemistry,	5	1 yr.	matics,	4	1 yr.	
				Chemistry,	5	1 yr.	

TABLE No. 42.—*Continued.*

CURRICULUM III.				CURRICULUM IV.			
Year.	Subject.	Periods per week.	Extent.	Subject.	Periods per week.	Extent.	
I.	English,	5	1 yr.	English,	5	1 yr.	
	Algebra,	5	1 yr.	Algebra,	5	1 yr.	
	Commercial History,	5	1 yr.	Physiography,	5	1 yr.	
	Commercial Geography,	4	1 yr.	Mechanical Drawing,	4	1 yr.	
	Penmanship,	2	1 yr.	Wood-work, Design Decoration,	8	1 yr.	
II.	English,	5	1 yr.	English,	5	1 yr.	
	Geometry,	5	1 yr.	Geometry,	5	1 yr.	
	French,	5	1 yr.	Mechanical Drawing,	4	1 yr.	
	Commercial Arithmetic,	5	$\frac{1}{2}$ yr.	Wood-turning,	8	1 yr.	
	Bookkeeping,	5	$\frac{1}{2}$ yr.	Pattern-making,			
				Molding and Cast- ing,			
				Forge and Vise Work,			
III.	English,	5	1 yr.	English,	5	1 yr.	
	Bookkeeping,	5	1 yr.	Physics,	5	1 yr.	
	Choose two:			French,	5	1 yr.	
	{ French,	5	1 yr.	Mechanical Drawing,	4	1 yr.	
	{ Physics,	5	1 yr.	Machine Work,	8	1 yr.	
	{ Stenography,	4	1 yr.				
	{ Typewriting,	4	1 yr.				
IV.	English,	4	1 yr.				
	American History and Civics,	4	1 yr.	English,	4	1 yr.	
	Bookkeeping,	4	$\frac{1}{2}$ yr.	American History and Civics,	4	1 yr.	
	Elementary Banking and Finance,	4	$\frac{1}{2}$ yr.	Chemistry,	5	1 yr.	
	Political Economy,	4	$\frac{1}{2}$ yr.	French,	5	1 yr.	
	Commercial Law,	4	$\frac{1}{2}$ yr.	Mechanical Drawing,	4	1 yr.	
	Choose one:			Tool-making,	8	1 yr.	
	{ French,	5	1 yr.	Machine-shop			
	{ Chemistry,	5	1 yr.	Practice,			
	{ Stenography,	4	1 yr.				
	{ Typewriting,	4	1 yr.				

The new program at Concord, including the mechanic arts curriculum, was approved and work first started in September, 1907. The work is therefore only upon its second year and has as yet hardly begun to settle into the grooves of systematic routine. Of necessity, the majority of the pupils cannot for some time to come be classified at all.

*Mechanical drawing* is taught in each of the four years, and it is expected that all construction will be first sketched and then worked up into working drawings as at Berlin.

First-year pupils: Solution of problems in working drawings of geometrical solids and the simplest parts of machinery. Problems in the intersection of solids with the development of resulting surfaces.

Second-year pupils: Machine sketching and drawing; conic sections and cycloidal curves; first twenty-one problems in Faunce's Descriptive Geometry.

Third- and fourth-year pupils: These pupils had little previous preparation. They were given a variety of work such as conventional methods of representing nuts and bolts, cams, gearings, etc., and a few wash drawings. Manifestly no systematic work could be done.

*Woodworking.* The regular prescribed work of the first year in carpentry, joinery and carving was done. Some difficult pieces were executed.

In the second year, the prescribed course in wood-turning and pattern-making was given.

The older boys were allowed to take up such parts of the iron work as they were capable of performing. Under the instruction of Mr. Gordon the older boys have for several years done some very creditable work in the construction of working machinery, such as gas engines, electric motors, etc., although the work has not been directly correlated with that now contemplated by the regularly approved mechanic arts curriculum.



## GILMANTON ACADEMY—AGRICULTURE.

The course of instruction at Gilmanton Academy corresponds to those at Berlin and Concord, save that it is adapted to rural rather than to urban conditions. It differs in that it has little or no foundation in the elementary schools to correspond to the manual training of Concord and Berlin, and it differs further in the fact that the

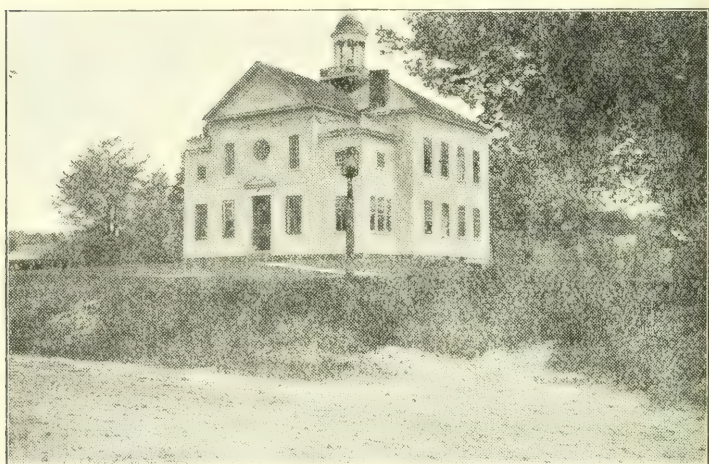


FIG. 6.

Gilmanton Academy.

academy is a private institution with little or no endowment instead of a tax-supported school. No school could undertake a new program with greater obstacles to be overcome, due chiefly to the poverty which has come upon it in its latter days.

TABLE No. 43.

## PROGRAM OF STUDY—GILMANTON ACADEMY.

CURRICULUM I.				CURRICULUM II.			
Year.	Subject.	Periods per week.	Extent.	Subject.	Periods per week.	Extent.	
I.	Latin,	5	1 yr.	Biology,	5	1 yr.	
	Algebra,	5	1 yr.	Algebra,	5	1 yr.	
	English,	5	1 yr.	English,	5	1 yr.	
	History,	5	1 yr.	History,	5	1 yr.	
II.	Latin,	5	1 yr.	Agriculture,	5	½ yr.	
	Modern Language,	5	1 yr.	Horticulture, or	5	½ yr.	
	Geometry,	5	1 yr.	Domestic Science,	5	1 yr.	
	English,	5	1 yr.	Modern Language,	5	1 yr.	
				Chemistry,	5	1 yr.	
				English,	5	1 yr.	
III.	Latin,	5	1 yr.	Rural Engineering and			
	Modern Language,	5	1 yr.	Farm Economy, or	5	1 yr.	
	Physics,	5	1 yr.	Domestic Science,	5	1 yr.	
	English,	5	1 yr.	Modern Language,	5	1 yr.	
				Chemistry,	5	1 yr.	
				English,	5	1 yr.	
IV.	Latin,	4	1 yr.	Animal Husbandry, or	4	1 yr.	
	Modern Language,	4	1 yr.	Domestic Science,	4	1 yr.	
	American History and			American History and			
	Civil Government,	4	1 yr.	Civil Government,	4	1 yr.	
	Mathematics Reviewed,	4	1 yr.	Mathematics Reviewed,	4	1 yr.	
	English,	4	1 yr.	English,	4	1 yr.	
				Modern Language,	4	1 yr.	



The pupil entering the academy thus has a choice between preparing for the classical college, or studying agriculture if a boy, or domestic science if a girl. The agricultural courses lead directly to the state agricultural college at Durham.

The work of the first year is the same for both the boys in agriculture and the girls in domestic science. In the second year these two curricula begin to differentiate. The school was approved in 1906 and therefore the regular work has not as yet progressed beyond the second year of the program.

*Work in agriculture for school year 1907-1908. Second-year pupils:*

Work in zoölogy and botany is reported in Chapter III of this part of the report.

The general method of instruction was lectures, field excursions, assigned papers. Time, five periods per week for one-half year.

I. Principles of plant growth reviewed.

II. Origin, formation and physical composition of soils,—mapping and water analysis.

III. Elements of fertility in soils, physical, chemical, biological.

IV. Water in its relation to agriculture.

V. Drainage,—field work and mapping.

Purposes, methods, effects.

Experiments in percolation and capillary rise.

VI. Irrigation.

VII. Tillage.

History, purposes, methods, effects.

VIII. Nitrification.

IX. Manures.

Sources, conservation, manufacture, application, determination of value.

X. New England field crops.

*Work in horticulture for school year 1907-1908.* Second-year pupils:

General method of instruction and time same as those for agriculture.

I. Principles of gardening.

II. Pomology or fruit culture (seven weeks).

Location, planting, cultivation, pruning, grafting, spraying, harvesting, marketing.

Fruits of northern United States studied individually.

III. Vegetable culture (six weeks).

Market gardening and home gardening.

Selection of seed, glass structures, pests and diseases.

Principal garden crops taken in order.

IV. Floriculture (two weeks).

Hothouse and outdoor.

Commercial and home.

*Work in domestic science.* Second-year pupils:

The general method of instruction in this year's work was three-fifths to four-fifths given to kitchen and laboratory work; the rest to tests and results.

I. Nutritive values in foods. Cooking of typical foods of each class.

II. Dietary studies. Composition of meals from nutritive standpoint.

III. Papers and readings on assigned dietary topics, such as beverages, their composition and uses.

IV. Nursing and invalid cooking.

V. Marketing—selection of foods.

VI. Preserving.

It should be borne in mind that the primary purpose of the curriculum numbered II is precisely the same as that of No. I, namely education. They are established in the belief that there is just as truly a cultural development

of the individual to be had from competent instruction in agriculture or domestic science as from competent instruction in Latin. Incidentally, it is expected that such courses in the academy will exalt agriculture and home making into a worthy place in the eyes of the pupils, that they will tend to turn more pupils back to the country town instead of turning them toward the city, that the graduates of these courses who do become farmers and home makers will be more efficient as such than they would have been had they pursued other studies.

It is too early as yet to draw conclusions. The work undertaken at Gilmanton must be understood to be experimental, and that in the midst of conditions hostile to success.

The principal of the school, Mr. Theodore H. Eaton, is a graduate of Harvard and of the Massachusetts Agricultural College. The assistant, Miss Van Nostrand, has been a student at Syracuse, Columbia, and Simmons College, having specialized in chemistry and domestic science. Both the principal and his assistant are competent to teach the usual high school subjects. Mr. Eaton teaches the agricultural and Miss Van Nostrand the domestic science courses.

The equipment has cost very little, nothing as yet for agriculture and about \$50 for a single set of equipment for a kitchen. The physical, chemical and biological apparatus is, of course, the same as that for any other high school. As work progresses, additional equipment must, of course, be purchased for both the new curricula.

#### COE'S NORTHWOOD ACADEMY—AGRICULTURE.

The program of study at Coe's is essentially the same as that at Gilmanton save that no curriculum in domestic science is laid out. The latter can, and doubtless will, be added as soon as the management finds itself justified in doing so.

TABLE No. 44.

## COE'S NORTHWOOD ACADEMY—PROGRAM OF STUDY.

CURRICULUM I.				CURRICULUM II.			
Year.	Subject.	Periods per week.	Extent.	Subject.	Periods per week.	Extent.	
I.	Latin,	5	1 yr.	Biology,	5	1 yr.	
	English,	5	1 yr.	English,	5	1 yr.	
	Algebra,	5	1 yr.	Algebra,	5	1 yr.	
	Ancient History,	5	1 yr.	Advanced Arithmetic,	5	$\frac{1}{2}$ yr.	
				Bookkeeping,	5	$\frac{1}{2}$ yr.	
II.	Latin,	5	1 yr.	English,	5	1 yr.	
	French,	5	1 yr.	Geometry,	5	1 yr.	
	Geometry,	5	1 yr.	Physics,	5	1 yr.	
	English,	5	1 yr.	Horticulture,	5	$\frac{1}{2}$ yr.	
				Agriculture,	5	$\frac{1}{2}$ yr.	
III.	Latin,	5	1 yr.	English,	5	1 yr.	
	French,	5	1 yr.	Chemistry,	5	1 yr.	
	English,	5	1 yr.	Composition Physiol-			
	Physics,	5	1 yr.	ogy,	5	$\frac{1}{2}$ yr.	
				Rural Engineering,	5	$\frac{1}{2}$ yr.	
				French,	5	1 yr.	
IV.	Latin,	4	1 yr.	English,	4	1 yr.	
	French,	4	1 yr.	American History,	4	1 yr.	
	English,	4	1 yr.	French,	4	1 yr.	
	American History,	4	1 yr.	Rural Economy and			
	Mathematics Reviewed,	4	1 yr.	Farm Management,	4	1 yr.	
				American Husbandry			
				and Dairying,	4	1 yr.	

In arranging a teaching force to handle this program, a policy has been followed somewhat different from that of Gilmanton. Principal Welch retains the general management of the institution and teaches some of the college-preparatory subjects, while the agricultural lines are handled by a graduate of the New Hampshire State Col-

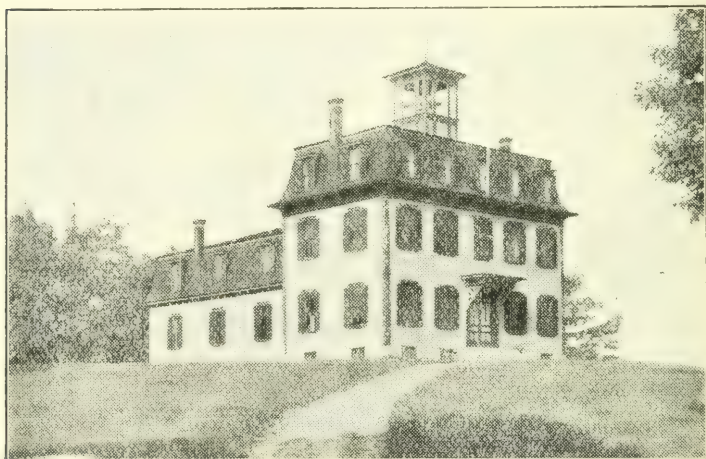


FIG. 7.

Coe's Northwood Academy. Founded 1867. Agricultural Course approved 1907.

lege. The faculty for the year 1908-1909 is as follows:  
Edwin K. Welch, Bowdoin—Latin, French, English.  
Roy V. Swain, New Hampshire—Mathematics, English.  
Laurence A. Carlisle, New Hampshire—Agriculture, Science, History.

The academy is fortunate as compared with Gilmanton in that it has a substantial endowment and is in possession of a considerable tract of land including two home-  
stead sets of buildings.

*Report of work in agricultural curriculum 1907-1908.*

(Submitted by Principal Welch.)

*Fall term. Text-book:* Study of soils with some study of the different tools for tillage; drainage and the arrangement of fields.

*Laboratory:* Simple experiments to illustrate the formation of soils; the amount of soil in running water; the way in which water deposits its soil content; the amount of water in soils; effect of mulching and tillage on the water content of soils.

*Field:* Study of the weathering of rocks; local varieties of soil; erosion and transportation of soils.

*Winter term. Text-book:* Study of soil composition, plant foods, manures, fertilizers, how to care for each, green manuring and crop rotation. Horticulture: plant physiology and growth, nutrition, transplanting, pruning, grafting, insects and their control, seed selections.

*Laboratory:* Growth of plants in different varieties of soils, and with different kinds of fertilizers. Horticulture: transplanting in pots, growing plants in pots and boxes, grafting, etc.

*Field work,* latter part of winter and spring: Construction and care of hotbed.

Care of garden plots illustrating effect of different kinds of fertilizers, different kinds of tillage, selection of seeds.

Transplanting of fruit and shade trees; renovating old trees in orchard; top grafting same; spraying and preparation of spraying mixtures.

In the fall the field work to be continued by work in harvesting, curing and storing the different kinds of crops planted. Picking, sorting and packing of apples.

We are preparing for the work in animal husbandry and dairying so as to be ready when we get to it. I have at present two cows and two heifers and am planning to have soon from six to ten cows in various stages of develop-



ment. I have placed in the laboratory a Babcock tester, which can be used in physics as well as in agriculture. I hope to be able to secure a cream separator. I am planning to bear down upon the production of sanitary milk, the growing and feeding of young stock as well as the feeding of mature cows, horses, etc. I hope also to be able to do some work in forestry, as the academy owns nearly two hundred acres of land covered with wood and timber.

Considerable time will regularly be spent in visiting good farms for inspection of the work done and of the stock.

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## CHAPTER VIII.

### THE STATE NORMAL SCHOOL.

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“The superintendent of public instruction, in his annual report, shall state the condition of the school, the terms of admission and graduation, the times of the commencement and close of the sessions.” Public Statutes, chapter 95, section 10.

### THE CONDITION OF THE SCHOOL.

During the two years covered by this report, I have visited the State Normal School about once in every six weeks. In addition to these visits, I have met trustees or principal, or both, in frequent conferences.

*Method of administering the institution.* The trustees have constituted the principal of the school their executive officer, have committed to him all the details of administration, subject to their general direction and approval. He is therefore responsible for the general efficiency of the school. The trustees meet regularly four times in each



year, and on the average there is a special meeting for every general meeting.

*The teaching force.* The financial support of the school is sufficient to enable the board to employ a high grade of teaching ability and the principal has been given a free hand permitting him to create and keep up a faculty for both normal and model schools suited to his aims and policy. Like all other institutions, our school periodically loses the best of its faculty, drawn away by more attractive positions, but in spite of this fact, in the educational equipment, professional insight and teaching power of its faculty, the school is kept up to a standard excelled by few others. There is at present outlook no good reason, either financial or administrative, why the quality of the teaching force should in any way deteriorate.

The principal, Dr. James E. Klock, was at the close of the last school year, invited by the Massachusetts State Board of Education to become the head of the Lowell Normal School. The trustees were fortunately able to retain the services of Dr. Klock.

*Professional instruction.* The program of the school has two related, but not consecutive, parts,—the pedagogical courses for the students under instruction, and the elementary schools and kindergarten of the village of Plymouth used as model and training schools for the normal school.

The professional instruction contemplates two years of study upon strictly professional topics, including observation in the model school and practice teaching. Persons who have already had some experience as teachers may come in for one year in a teachers' course, so called, but they do not receive the regular diploma of the school. The professional instruction given devotes a minimum to the details and minutiae of the routine of the teachers' life, and a maximum to the spirit with which the teacher should be actuated. In my judgment, the school succeeds

in the end which its instruction plainly contemplates, namely, the production of a class of teachers endowed with high ideals of what schoolroom work should be, and with an appreciative insight into the working of the child mind. The graduates are not often armed beforehand with that practical knowledge of the routine of the schoolroom which insures that they will begin work without friction on the first morning of their independent teaching; they do accumulate a store of resources at the normal school which soon enables them rapidly to devise ways and means of school management.

The most serious drawback to the professional instruction of the normal school, is the lack of adequate training facilities. Academic instruction in psychology, pedagogy and similar subjects is of little account in the absence of adequate opportunity to learn how to put precept into practice. The elementary schools in the village of Plymouth, which form the model and training school of the normal school, enrol somewhat less than three hundred pupils. This would be sufficient for training purposes of a normal school having an enrolment of one hundred pupils or more, provided the schoolrooms were ample in size to contain the pupils. Such, however, is not the case. These elementary schools are housed in but four main rooms with makeshifts for accommodation in the corridors and recitation rooms. The result is that no proper training can be carried on for even a small normal school. Lack of training is most apparent in the not infrequent cases in which graduates of the normal school find discipline difficult when given their first independent charge. Sufficient scope for training would make it possible to give prospective teachers some independent experience before leaving the normal school.

Given sufficient room for the children, there would be children enough to furnish training for one hundred or more normal school teachers. The trustees have instructed

the principal to limit the size of the school to one hundred and fifty students. It is doubtful if even this number can be carried without allowing effective results to fall off, certainly no more should be admitted even under the best conditions. That is the maximum number possible in a town having the public school enrolment of Plymouth, assuming that the maximum efficiency of the normal school is desired.

*Instruction in the model and training schools.* The contract with the district of Plymouth provides that the trustees shall maintain a village system of elementary schools capable of preparing for a standard high school.

Out of respect for their contract, as well as actuated by the necessity of providing model schools of the highest grade for the sake of the students of the normal school, the management has aimed to make the elementary schools all which modern educational science can suggest. The course of study is perhaps the most complete to be found anywhere in the state, and the teachers are women whom salaries higher than any paid elsewhere in the state have attracted to the work.

How far the purposes of the management have been realized in the actual competency of the pupils upon graduation, nobody can say with any great degree of precision. The situation is similar in this respect to that of all modern elementary school systems.

Measured by the popular verdict, the efficiency varies according to the point of view of the judge. The citizen who thinks that the children should be able to catalogue the capitals of the nations of the world or to compute rapidly the interest due upon a commercial paper of complex lineage, is apt to scoff at the character of the instruction given. The next observer, however, is perhaps just as likely to discover in the pupil a wealth of information which he himself never dreamed of learning at school;

and not unnaturally he draws conclusions as to the excellence of the school far in excess of its real excellence.

Measured by the ability of the pupils to do high school work, the verdict varies according to the point of view of the high school teacher. If the purpose of the school is to prepare pupils for the narrow range of high school study, itself in the main little more than a drill for the college classroom later on, then the instruction given in the model schools is not what it should be. If, on the other hand, the primary business of the model school is to take the pupils as it finds them, give them the instruction for which it finds them best adapted and most needful; and of the high school to receive them as they come from the lower schools and continue the process begun in the lower schools, then the present criticism of high school teachers is absolutely indeterminate.

Probably the most accurate judgment of the model schools is to be found in the opinion expressed by the city and district superintendents in conference assembled at Plymouth in March, 1908. After inspection the superintendents expressed themselves substantially in this way: We cannot judge of the results secured in the model schools because we lack sufficient information; if the thoughtful activity of pupils is any criterion of mental growth and efficiency, the efficiency of the model schools must be considered very high.

In visiting the institution, I have frequently inspected the model schools and have several times tested them with unexpected examination papers. My own conclusions are therefore here given.

I. I endorse the statement made by the superintendents in full.

II. Pupils show upon tests:

(a) In first instance a low percentage of correct answers.

(b) Upon subsequent tests, not only the highest percentage of correct answers found in any system in the state which I have tested, but much the highest percentage of papers showing originality of thought.

These tests were absolutely unexpected and the questions involved matters never specifically covered in the classroom. The difference between (a) and (b) was probably due to the fact that the children had never been tested in this manner before and therefore did not do themselves justice upon the first series.

III. The model school lacks somewhat, as do nearly all our best schools, in thorough rounding up and clinching of instruction, in frequent tests revealing to the older pupils the actual extent of their knowledge,—in brief, in putting pupils so fully in possession of their knowledge that they are able to use the same effectively on demand.

It must be understood, however, that the model school is a part of the state and even the national system of public schools. It must constantly receive a considerable number of pupils from other towns and from other states, whose primary schooling is often defective, and for whom it cannot therefore be held responsible even though the latter part of their school career may have been within its charge.

*Health of students.* The principal has given unremitting attention to the hygienic conditions of the institution and to the general health of the student body. The normal condition of the latter is now high. In any group of young ladies of equal size it would be hard to find a larger proportion of robust, vigorous young womanhood, a marked contrast to the anæmia so prevalent only a few years ago.

The forces which have brought about this change for the better, aside from the generally improved sanitary conditions of village life, seem to the writer to have been the following:



The dormitory has been put in a much more sanitary condition than prevailed a few years ago, not only with reference to the plumbing, but also with reference to the general conditions of cleanliness.

The food furnished to students, while simple in character, is generally well cooked, well chosen and served, and ample in quantity. It is not a simple matter to carry on a boarding house of this size, furnishing a constantly improving table, on no increase in price, during a period of constantly increasing cost of foodstuffs, under the restriction of being compelled to keep within a narrow margin of increase upon the actual cost.

The character of the instruction of the normal students is conducive to good bodily health, in that it puts a premium upon interested, wholesome, mental effort rather than upon the utterly pernicious cramming for recitations so characteristic of nearly all secondary and higher institutions in this and in other states.

The general spirit of the student body is conducive to rational living,—rational work and rational exercise. It tends away from the wear and tear of artificial social functions on the one hand, and from the no less harmful morbid introspection induced by the repression of all spontaneity on the other. The girls have a wholesome dance under proper restrictions now and then, but they do not keep it up all night and insist on something of the kind every night. They have all the basketball and similar exercise which they want, but they do not engage in the frenzied rivalry of interscholastic contests.

Still further improvements would undoubtedly result from correction of the evils of bad ventilation in the classrooms of the school building, and from the provision of a suitable gymnasium.

*Discipline and general conduct.* As to the general spirit and conduct of the school, there will be as many

different judgments as there are different opinions of what constitutes good conduct.

If the measure of good conduct is a prim young woman of the schoolmarm type who walks the street with down-cast eyes and aims to mark herself outwardly and visibly as belonging to a calling set apart for a peculiar work, then the discipline of the school is not even approximately good.

If the measure of good conduct is a young woman whose demeanor indicates that she intends to be in the fullest sense a natural and wholesome person, permitting herself all which a lady may enjoy and caring for little, if anything, which a lady may not enjoy, denying that she is under any obligation whatever to cultivate a special and extra-natural demeanor because she expects to be a teacher, then the discipline of the school is excellent.

The method of school management employed is self-government. The school is organized as a regular state government. It establishes its own laws of conduct, and enforces its own laws,—all of course subject to the approval of the principal. As a matter of fact, the principal is seldom obliged to interfere other than by a word of counsel and bad cases of discipline have been practically nil during the past four years.

*Condition of plant.* The plant consists of the schoolhouse, rated as a twelve-room building, of brick construction; the dormitory of wood, containing twenty-one single and thirty-six double student's rooms, dining and reception rooms, kitchens and laundry; and the principal's residence, a small frame cottage. The entire plant is heated from boilers in the schoolhouse and lighted from a two-unit electric installation housed in the boiler room. Water is taken from the town mains. Ice is harvested by the management and stored in an ice-house erected during the past year on the dormitory lot.



The schoolhouse is of the period of the late "eighties," and, like most buildings of that era, has in it a great deal of waste room. In general construction, the building is comfortable and well appointed for a small normal school and a small model school. For schools of the present size it is insufficient and ill adapted.

All of the schoolrooms for the model school are crowded approximately to twice their normal capacity. In the interest of the health of the pupils, the trustees have placed the first four grades upon half time. The fifth and sixth grades ought to be treated the same. The rooms used as classrooms for the normal school are also crowded to quite double their capacity.

The ventilating system is of the forced-draft plenum type with partial vacuum equipment in addition. It was faulty in construction to begin with, but with the higher power recently given to the engine is probably capable of giving fair ventilation to rooms filled to their normal capacity, certainly not to rooms carrying a double load.

The heating and lighting installation for the entire plant is located in the basement of the schoolhouse. This seemed at the time the best feasible disposition. The boilers should ultimately be moved into a separate building and a suitable coal pocket built. The boilers are inspected semi-annually by the company carrying the insurance, and are kept strictly within a wide margin of safety.

More room is urgently needed for the regular scholastic side of normal and model school work. The present building will accommodate the normal school proper at any size which it is likely to attain, together with two grades from the model school. Another elementary school building should at once be provided by the town of Plymouth to accommodate its growing public schools. With this addition, room enough would be in sight for as many years as we can foresee the natural growth of the town.

The normal school should be allowed to grow only as the town grows.

The dormitory is an unlovely but fairly comfortable and now reasonably safe building. It is to be regretted that the young people who are training to be teachers of our children should be housed in a structure so conspicuously inferior to the corresponding buildings at other higher institutions of learning. However, all that can be done seems to have been done to make the building comfortable, homelike and safe. Protection from fire has received special attention. Suitable fire-escapes are in place on the outside of the building; doors open outward; standpipes with hose connections reach every floor and chemical extinguishers are liberally distributed. At a fire drill in my presence, the young ladies emptied all three floors and had the fire hose ready to play in fifty seconds from the time of alarm.

I doubt the wisdom of spending more money on this building. It ought to be large enough to accommodate all the students who wish to room in the dormitory, but it would be better to wait until the state can see its way clear to rebuild entirely on better lines.

The development of the normal school plant has been largely a piecemeal process, inevitable no doubt in the case of a pioneer institution. But the time ought to have passed for all that. The school is located in a beautiful region, and in a village of rare artistic possibilities. One of the missions of its graduates ought to be to carry the gospel of village improvement all over the state. It would be a pity that they should not have before them the object lesson of a normal school plant of beautiful space and place relations, a unity of buildings rather than haphazard locations.

*Financial conditions.* For details under this head the reader is referred to the report of the trustees.

The annual income is the appropriation of \$25,000 made by the state, plus \$1,000 tuition paid by the district of Plymouth, plus \$1.35 per capita of attendance paid by the district for text-books and supplies.

In the expenditure of this income, the management has constantly sought new means of saving upon such charges as material supplies and cost of operating the plant. The savings have been considerable. They have been devoted to improvements in the plant in the interest of further economies, and to extending the usefulness of the school by the addition of a summer term of eight weeks. This last improvement alone has added very materially to the output of the school,—just how much cannot be told until the graduation of the first of the summer classes in 1910; it is likely to be not far from twenty-five per cent.

All purchases, excepting small items representing occasional needs, are made upon specifications furnished the open market, and the contracts for the same are awarded to the lowest bidder. The saving here has been large.

The central heating and lighting plant installed in the summer of 1906, has saved a lighting bill of approximately \$800. It has saved at least twenty per cent. in cost of heating, and when perfected is expected to save one-third of the present cost.

Smaller economies have been made in such matters as the storage of the school's own ice.

Further adjustments in the direction of economy would be the proper housing of the coal, suitable platform scales for weighing each day's coal, an independent water supply sufficient for all domestic purposes except cooking and drinking, and a new contract with the district of Plymouth.

Our contract at present calls for a tuition charge of \$1,000. The teaching force in the model school proper, which is really the village elementary school of the town

of Plymouth, costs about \$8,000 per year. While it is difficult to distribute the cost of operating the plant between the normal school and the model school, it is safe to say that the cost to the state of the village schools is not less than \$9,500. Now, the average cost of schooling pupils in the ordinary village schools of the better class for a district having an enrolment of Plymouth, would not be far from \$5,500. That is what the town would have to pay for its schools were the normal school elsewhere.

Now it is right that the state should furnish better schools than the town would ordinarily furnish for itself. It must do so in order to do its work of training teachers. It is perhaps too much to expect that the town would wish to furnish as good schools as the state must have. It is an advantage to the state to have the village schools for training purposes.

On the other hand, it is certainly in manifold ways an advantage to the town to have the school located as it is. The children get much better schooling than they otherwise could. The school is a business asset for the town.

Furthermore, the building was erected and paid for by the state.

It is therefore hard to see why the state should furnish \$9,500 schools and school buildings for \$1,000 per year, when it would cost the town \$5,500 plus the cost of buildings were the normal school elsewhere.

If the town were to furnish its own schoolhouses and pay a tuition charge equal to the average cost of maintaining village schools in the state at large, it would still have a great advantage.

#### TERMS OF ADMISSION AND GRADUATION.

Students are admitted to the *regular and kindergarten courses* of two years each who are graduates of an approved high school or academy.

Graduates of this school or of other schools of equal standing, are admitted to a *post graduate course* of one year.

Teachers of experience are admitted to a *teachers' course* of one year.

A *special course* of one year is offered to college graduates.

A *summer session* of eight weeks is held. Attendance at each summer session counts one-quarter toward the completion of the teachers' course.

Students in the regular, and special college graduate, courses who maintain the requisite standing in the several studies are awarded the diploma of the school. Students passing the final examinations in these courses are entitled to the state teachers' certificate appropriate to their preliminary education.

Students maintaining the requisite standing in the several studies of the teachers' course are awarded a certificate for that course.

#### TIMES OF COMMENCEMENT AND CLOSE OF SESSIONS.

##### *Thirty-seventh School Year.*

First term began, Tuesday, September 4, 1906.

First term ended, Friday, January 18, 1907.

Recess, December 14 to January 2.

Second term began, Tuesday, January 22, 1907.

Second term ended, Thursday, June 13, 1907.

Recess, April 5 to April 23.

##### *Thirty-eighth School Year.*

First term began, Tuesday, September 9, 1907.

First term ended, Friday, January 24, 1908.

Recess, December 20 to January 7.

Second term began, Tuesday, January 28, 1908.

Second term ended, Thursday, June 11, 1908.

Recess, April 3 to April 21.

#### RELATION OF NORMAL SCHOOL TO PUBLIC SCHOOLS.

The primary purpose, if not the only purpose of the normal school, is to train teachers for the public schools of the state. A proper conclusion to this report is to set forth the extent to which the normal school is serving its chief purpose.



TABLE No. 45.  
SHOWING DISTRIBUTION OF GRADUATES, 1907.

CLASS.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889
Number graduated .....	6	37	41	13	32	35	42	35	20	...	2	10	7	21	9	4	22	14	27
Boys .....	2	7	9	1	4	5	6	...	4	...	...	2	...	...	...	...	1	...	...
Girls .....	4	30	32	12	28	30	36	35	16	...	2	8	7	21	9	4	21	14	27
Number living .....	4	28	30	8	27	31	34	30	15	...	1	8	6	17	8	4	18	14	27
Number teaching .....	1	...	...	2	4	3	3	2	1	...	1	4	4	5	1	1	6	3	4
Number teaching in New Hampshire .....	...	...	...	...	1	1	2	1	1	...	...	1	1	...	1	...	3	...	1
Number living in New Hampshire .....	2	14	16	3	11	16	17	15	7	...	...	2	2	5	2	1	11	6	14
Percentage of those living in 1907 who are teaching in New Hampshire .....	...	...	...	...	3	4	6	3	6	...	...	12	16	...	12	...	12	...	3



TABLE No. 45.—Continued.

CLASS.	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	Total.
Number graduated.....	21	24	21	21	27	19	17	34	20	21	37	40	39	54	48	54	54	928
Boys.....	2	.....	.....	.....	.....	.....	.....	1	...	1	.....	1	1	1	1	.....	1	50
Girls.....	19	24	21	21	27	19	17	33	20	20	37	39	38	53	47	54	53	878
Number living.....	20	23	19	20	25	18	16	32	19	21	37	39	39	54	48	54	53	847
Number teaching.....	6	6	4	8	8	11	2	20	9	12	23	24	21	42	40	45	46	372
Number teaching in New Hampshire.....	4	4	1	4	3	3	1	12	6	7	11	14	14	28	22	42	43	231
Number living in New Hampshire.....	14	11	12	11	18	7	10	20	10	15	21	20	25	37	29	51	48	503
Percentage of those living in 1907 who are teaching in New Hampshire .....	20	25	5	20	12	16	6	38	33	33	30	36	36	52	46	78	81	.....

Some of the conspicuous revelations offered by the table are the following:

The enrolment of boys has practically disappeared, due partly to the gradual exclusion of men from teaching in the elementary schools, and partly to the fact that the school was more academic and less professional in its early days.

Beginning with 1900, the school entered upon a new era in the size of its annual output, and has reached its maximum development in this direction.

Since 1881 the school has been steadily growing in public favor, the size of its graduating classes being the criterion. Breaking up this period into five half-decades, the following summary shows in numerical terms the increase of the school in this respect:

Years.	Total number graduates.
1881-1885,	59
1886-1890,	88
1891-1895,	112
1896-1900,	129
1900-1905,	235

The most discouraging showing made by the table is the rapidity with which the graduates of the school disappear from the ranks of teaching and particularly from the ranks of New Hampshire teachers. Eight hundred forty-seven graduates of the institution were living in 1907, and of these but 44 per cent. were teaching and but 28 per cent. were teaching in New Hampshire. A reference to the table will show that the great majority of those who are teaching are recent graduates. Apparently, we can hold a large percentage of graduates within the teaching profession for about five years; a smaller percentage, about one-third, for five years longer; and ten years after

graduation finds us with an approximately permanent and constant residue of about 10 per cent.

Both these factors are beyond the power of the normal school to correct. So long as a calling is so exclusively in the possession of women as is teaching in New Hampshire, professional life must be short and enormous waste must be met if efficiency is to be attained. So long as the teacher's wage in New Hampshire is much less than that of states within easy reach, and so long as graduates are required to teach but two years within the state, we must expect to meet with heavy losses to other states within five years of graduation.

Of the 847 living graduates, 503 or 59 per cent. were living within the state. Here is a partial offset to the loss mentioned in the last paragraph. Graduates of the normal school are probably well nigh as valuable to the educational interests of the state in the home as in the teacher's chair. If the percentage just quoted were 80 per cent., we might reasonably conclude that there was no serious loss. If the term under which the graduates of the normal school are required to practice in the state were increased to five years and wages put upon a basis on which our school boards could compete with those of other states in employing teachers, then we should retain a larger share of our product and at the same time increase the probability that the graduates would marry in New Hampshire, and carry their normal training into a generation of New Hampshire homes.

It is often observed that the normal school does little to train teachers for positions above the primary grades and almost nothing to train teachers for rural mixed schools.

I find that both criticisms are founded on fact, but that they do not state the whole truth and that so far as they do speak the truth there is little just cause of adverse criticism in the normal school.

The main emphasis of the actual practice teaching does undoubtedly fall upon the first four grades of the model school. It is to be regretted that training is not thorough, and equally thorough, throughout the grades and in several model mixed schools as well. On the other hand, it should be remembered that the fundamental principles of teaching as such are equally good in the primary school and the university, in the graded school and in the rural mixed school. The best training in primary schools does not mean the best training for grammar or high schools, but it does mean training which is better than none. In many ways, the grammar school teacher and the high school teacher can learn from the primary teacher. Again, the bare fact that the normal graduate is thought not to teach well in the grammar school is quite as apt to be due to a wrong point of view in the observer as to defective training in the teacher. If the normal graduate is expected to be an efficient crammer, of course she will not be a success.

On the other hand, it is undoubtedly true that we need teachers, trained not only in general method but in the special methods of the grades of school in which they are to teach. It is equally true that the normal school under existing conditions can give better training for the primary than for the grammar school, and can give next to none specifically for the mixed school as such, nor for the high school. What are the conditions?

In the first place, the model or training school must give as good or better schooling to the children who attend as any school system in the state. To enable this to be done the grammar school especially must be kept much more closely under the tuition of the best obtainable regular teachers.

In the second place, it is impossible to combine effectively model school and training school. The principal has frequently declared, with wisdom, that the teacher under

training can rise no higher than her ideals. You can make a model school a place for the establishment of ideals; you cannot make a training school such. Therefore, in a school community in which there is no room for both, the elementary schools must tend to become model schools rather than training schools. This fact makes it especially hard to train grammar school teachers. The normal school can instruct them in the principles, it can give them the example of a good grammar school; it cannot give them the independent experience under oversight essential to the fulness of training.

Finally, you can train teachers in the long run only for those schools economically desirable. The Plymouth school cannot train for mixed schools for the reason that one of the chief reasons why students go to normal schools is that they may command wages such as graded schools pay. Increase the wages of teachers in rural mixed schools to the point at which this class of schools will become equally desirable with the urban or village school, and there will arise a demand for specific training, which the normal school can give as soon as there is anybody to take it. Again, there is no demand for high school training, since there is no economic pressure sufficient to cause high school teachers to add normal training to college education.

We manifestly first need more normal schools so located that there will be ample room for (1) one complete eight grade and kindergarten system for model school purposes, and (2) as many rooms as may be needed for training purposes throughout the elementary school.

Specific training for mixed and high schools will have to wait until economic conditions make such respectively possible.

## CHAPTER IX.

## MORE NORMAL SCHOOLS NEEDED.

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The average size of the last five graduating classes in the regular course at Plymouth has been thirty-seven students. It is not likely that the average for any future period of five years will be less than this. It is probable that the average will slowly but steadily rise; it cannot rise above seventy-five and cannot reach that mark without seriously impairing the efficiency of the school, for reasons set forth in the last chapter. Nor can it reach the seventy-five graduate mark unless all teachers' and special courses are discontinued.

The average number of teachers without experience needed each year to recruit the teaching force has been, for the past ten years, 355. It will be seen from the following summary that the extremes do not vary much from this mean value.

Year.	Number teaching first term.
1899,	378
1900,	359
1901,	343
1902,	324
1903,	297
1904,	331
1905,	349
1906,	376
1907,	349
1908,	347

The cities of Concord, Nashua, and Portsmouth still maintain city training schools. The city of Manchester has



done so until the present year. In understanding the normal school situation, these city training schools must be taken into account. The essential statistics are here presented.

TABLE No. 46.

## STATISTICS OF CITY TRAINING SCHOOLS FOR TEACHERS.

	Concord.	Manchester.	Nashua.	Portsmouth.	Total.
Number graduates 1907.....	1	6	8	5	20
Number of these now teaching in city.....	1	6	4	4	15
Number graduates 1908.....	3	4	6	.....	13
Number of these now teaching in the city.....	2	4	.....	.....	6
Proportion of whole elementary teaching force graduated from local training school, per cent.	74	55	57	53	60
Proportion of whole elementary teaching force graduates of a normal school, per cent. ....	15	16	14	13	15

It should not be assumed of course that the twenty-five per cent. of teachers not assigned to either normal school or city training schools were wholly without training. Within the number were graduates of colleges, kindergarten training schools, and other training schools, both regular and special.

Now the Manchester city training school has been given up and the school board will in the future employ only normal graduates. This is in line with the history of the city training school all over the country, and all of our remaining three will undoubtedly be discontinued in due course of time, one or more probably at once should state normal schools be established in their vicinity. I think we must therefore regard the city training school as a negligible quantity in forecasting the needs of the state. In any



event, the aggregate output is not likely to be above twenty.

Other sources of supply are the normal schools of neighboring states, but since there is a home demand for their graduates, and since all our neighboring states, save Maine, pay higher wages, it is not likely that we are more than holding our own in the exchange of graduates.

Still another factor to be considered is the number of graduates in the special and teachers' courses at Plymouth. These have averaged thirteen for the past five years. It will readily be seen, however, that these cannot be included in estimating our needs. They are teachers of experience and when they go back to their work are not reported as "teaching for the first time." They help greatly in raising the standard of the existing teaching force, but not that of the recruits.

We must therefore set off against the average three hundred fifty-five, who are teaching for the first time annually, the average thirty-seven who are graduated from the regular courses of the normal school annually. *We evidently need then in some way over nine times as many new trained teachers annually as we are now getting.* We can solve the problem in two ways, first by graduating more; and, second, by making teaching more permanent, thus decreasing the annual call for inexperienced teachers.

Nor are we called upon to reopen the question. Are normal trained teachers any better than those without such training? The fact is, *the demand from our own school boards for normal trained teachers* is far in excess of the supply. The calls sent to this office indicate this. The principal of the normal school declares that he has at least five times as many calls for his graduates as he can fill.

*Should the demand be met by enlarging the present school or by providing other schools?* Unquestionably the latter.

The village schools of Plymouth have children enough to afford training facilities for less than the present enrolment of the normal school. To increase the size of this normal school is to make the training of teachers impossible.

Schools need to be located where a large proportion of the students can board at home. Prospective teachers are usually without large financial means. The board bill is and always will be an obstacle to preparation for teaching, so long as young people can prepare for stenography, nursing, clerical work, etc., without the cost of a board bill.

Schools need to be located in large population centers with good railroad connections in order to reach as large a number of the class just named as possible. Plymouth is situated in one of the most sparsely settled sections of the state.

Schools need to be located in sections as remote as possible from Plymouth in order to reach those sections not reached by Plymouth and also in order not to interfere with the legitimate Plymouth territory.

Schools need to be located in cities large enough to furnish abundant training facilities for any growth of normal schools which may be deemed expedient.

No school should be established in a locality in which there will be danger of temptation to the upbuilding of a very large school. All the data at our disposal point to the principle that the needs of the state would be best served by a policy which would contemplate ultimately five normal schools,—four in addition to Plymouth, distributed somewhat as follows as to maximum size: two of 150 students each; two of 250 students each; one of 350 students. A large enrolment of students is fatal to efficiency in any higher institution, unless unlimited money and power are available with which to pay and endow the

principal. In such schools you must have for principal a man of such organizing ability that he can command a very high salary and then you must furnish him with means to employ exclusively a very high grade of associates and a large number of them. In all very large higher institutions, from the high school to the university, even if a chief executive of very great ability is found, he is almost invariably backed with a faculty a large proportion of which is low paid and inefficient. Better several small schools with principals and teachers within our means, in which every student comes directly under the influence of principal and strongest teachers, than one large school in which the principal and the strongest teachers are remote from personal contact with the students and in which the bulk of the instruction is in the hands of tyros.

*Geographical location.* The sections of the state which are now most poorly served with normal school facilities are shown by the following table.

TABLE No. 47.

SHOWING DISTRIBUTION BY COUNTIES OF NEW HAMPSHIRE  
STUDENTS AT STATE NORMAL SCHOOL, 1906-1907.

County.	Number students.	Ratio of students to population of county.
Belknap,	15	1: 1,302
Carroll,	6	1: 2,816
Cheshire,	4	1: 7,830
Coos,	8	1: 3,666
Grafton,	18	1: 2,263
Hillsborough,	9	1: 12,516
Merrimack,	13	1: 4,033
Rockingham,	9	1: 5,680
Strafford,	12	1: 3,288
Sullivan,	1	1: 18,009

The number of students has largely increased since this last published list was issued, but the ratio of distribution is not widely different. Plymouth is in Grafton County near the southern boundary. The nearest counties are Strafford, Belknap and Merrimack. These counties with Grafton, which have 37 per cent. of the population of the state, furnish 61 per cent. of the pupils. Hillsborough, Rockingham, Cheshire and Sullivan, which have 52 per cent. of population furnish but 24 per cent. of the attendance at the normal school. It appears then that the counties which are nearest the school, although themselves sparsely settled, furnish the largest number of pupils. The counties having the largest resources are in general most remote from the school and furnish the fewest pupils.

The notable exceptions are the cases of Coos and Carroll which send a representation out of all proportion to their proximity to the school and to their population. This is only one of the many indications which the state superintendent constantly sees of the public school awakening going on in the north country. No other part of the state has been more vigorously and efficiently alive to the needs of good schools during the past ten years than the counties of Coos and Carroll. The exceptionally large proportion of the equalization fund which these counties receive has probably been a stimulus in this direction.

The greatest most evident need of more normal schools is undoubtedly in the counties of Cheshire, Sullivan, Hillsborough and Rockingham,—and greatest of all in the first two.

The proper location of the new schools, all of which ought to be and probably will be established within the next ten years, should therefore, as it seems to me, be:

I. In the southwest part of the state, in Keene, the only community in that part of the state which has an average attendance sufficient to furnish training facilities.

This school should contemplate a maximum enrolment of 250.

II. In the lower Merrimack valley, at either Manchester or Nashua. This school should be planned for a maximum enrolment of 350, and either city has training facilities amply sufficient to carry this number.

III. In the southeastern part of the state at either Portsmouth, Dover or Rochester, either of which has attendance sufficient to warrant a normal school with a maximum enrolment of 250.

IV. In the extreme northern part of the state, either at Lancaster, Colebrook or Berlin. Lancaster and Colebrook could either of them carry enrolment equal to that of Plymouth, Berlin one considerably larger.

Schools located as above suggested would fulfill the essential requirements of distribution.

1. Each would supply a part of the state now poorly supplied with trained teachers, and would draw for its enrolment upon areas which now furnish relatively few students.

2. With the exception of Colebrook, each of the towns named is a railroad center and that town is a natural center for a considerable number of towns lacking railroad facilities. In the cases of the first three locations, nearly all students could board at home.

3. Each has elementary schools sufficient to provide adequate training and model school facilities for the enrolment contemplated.

In the light of our experience at Plymouth, I think there can be no reasonable doubt that any of the four schools suggested or all of them would enrol a very respectable number of students at the very outset, or that all of them would in a very few years fill to their maximum capacity.

It would probably be unwise to undertake the building of this full program at once. It ought to be entered upon,



however, at once by the erection of at least two of the four schools.

*Cost of the new schools.* The first cost of each school would not be greater than the cost of a moderate-sized city high school building. No dormitory construction need be provided for. I believe that it would be sound policy to construct a school building large enough only to contain the maximum enrolment, thus precluding so far as possible, the possibility that any one school should become outgrown. The four schools suggested would provide for all our needs so far as common schools are concerned until the population of the state shall have very largely increased. When that comes to pass it will be time to make fresh locations.

All model and training school buildings should be provided for at the outset by the cities in which normal schools are located.

The plant to be provided by the state for each school, then, would simply be one substantial sanitary schoolhouse, as beautiful in its architecture as circumstances should permit, and as well adapted to its purpose as science could show us how to construct. From \$50,000 to \$75,000 for each school, according to capacity needed, would suffice.

The annual cost of operation would be less in each case than that of Plymouth. The contract with the town of Plymouth, as I have pointed out above, costs the state at least \$4,000 annually more than any new contract with a different town would be likely to cost. On the other hand, it would be folly to cramp new schools with insufficient appropriations. The appropriation for Plymouth is \$25,000.

TABLE No. 48.

## WHAT OTHER STATES ARE DOING.

(United States Commissioner's Report, 1906.)

Location.	Number teachers.	Number normal students.	State, county and city appropriations.
Maine.			
Castine,	9	312	\$10,000.00
Farmington,	9	263	10,000.00
Gorham,	9	155	10,000.00
Presque Isle,	7	58	10,000.00
Fort Kent,	5	16	3,500.00
New Hampshire.			
Plymouth,	9	115	26,000.00
Vermont.			
Castleton,	7	121	7,500.00
Johnson,	7	79	7,500.00
Randolph,	8	71	7,500.00
Massachusetts.			
Bridgewater,	16	251	46,981.00
Fitchburg,	21	138	38,618.00
Framingham,	15	204	31,442.00
Hyannis,	7	51	30,000.00
Lowell,	11	143	28,740.00
North Adams,	28	112	30,897.00
Salem,	15	184	35,750.00
Westfield,	7	170	29,770.00
Worcester,	13	128	23,496.00
Boston,	19	340	.....
Normal Art,	18	352	31,326.00
Rhode Island.			
Providence,	29	283	54,000.00
Connecticut.			
Bridgeport,	9	49	12,508.00
Danbury,	8	83	22,222.00



## Connecticut.

New Britain,	47	245	\$23,289.00
New Haven,	39	229	21,000.00
Willimantic,	16	91	23,489.00

It should be understood of course that none of the states named, except possibly Massachusetts and Rhode Island, is sufficiently well supplied with normal schools to care for its own needs. In Maine and Vermont, notably, the normal school problem is the subject of anxious consideration.

*Probable effect of new schools upon Plymouth.* One of the first questions which naturally occurs to anybody who considers the establishment of additional schools is this, Will not new normal schools tend to cut down the attendance at Plymouth? The answer upon due reflection must, I think, be no.

New normal schools would reach a territory which sends very few students to Plymouth, and the attendance at either of the schools proposed above would little or none of it go to Plymouth in any case. Such attendance would come chiefly from that class which now teaches without preparation.

Again, the advance applications for admission to Plymouth are now equal to one-third the attendance, and this in spite of the fact that the school does no advertising at all. The territory which is now most naturally contributory to the Plymouth school, and which would not naturally send students elsewhere is amply sufficient to provide an attendance of more than 150 annually for the present normal school. The existing high schools and academies in this territory have a present membership of about 1,700 and this number is rapidly increasing. These schools would supply the chief attendance in the regular course. Besides these would of course be the students in teachers', special and summer courses, coming largely from elsewhere than the secondary schools.

Finally, and most important, the erection of new schools would popularize the idea of normal training to such an extent that the existing attendance from the Plymouth territory would be enhanced. School boards being able to secure normal graduates would tend to employ them to the exclusion of all others, and this would of course stimulate attendance at all the normal schools.

*A look into the future.* Our public school system has developed very slowly, changing from time to time as needs have forced themselves upon our attention. I have set forth in this chapter of my report what seem to me the needs of the common schools in the direction of trained teachers, and likewise have proposed a building program designed to furnish normal schools at the most advantageous points in the state. If the program were completed at once it would probably leave us with normal school graduates in large numbers who could not secure positions. Not every town by any means would employ normal graduates if it could get them. The existing demand is sufficient to warrant the building of three of the new schools at once. At least two schools ought to be built at once in order to relieve a serious stringency in the supply of teachers. I presume that a decade will be needed in which to complete with deliberation and assuredness the program which has been suggested above.

Meanwhile, it ought not to be forgotten that need of trained teachers elsewhere than in the common schools must be foreseen, and demands for the satisfaction of those needs anticipated.

We have no adequate normal training for high school teachers. At present the high school teacher knows his subject as never before. He has made little or no progress in the scientific study of the art of imparting a knowledge of his subject to others. In this respect, American secondary and collegiate teaching is greatly inferior to that of France and Germany, notably. No American state has

more than attempted an effective solution of the problem. Eminent professional authority has, however, undertaken the task of making preliminary investigations. While as a state we shall doubtless be compelled to leave to states which pay higher salaries to secondary teachers the honor of conducting the first successful normal schools for this class of teachers, we must foresee that the time will come when we too must undertake the task. We may without exaggeration regard the institutes for high school teachers which have been held this fall term as the precursors of such training.

Another form of professional training which must sooner or later be provided, will be that of superintendents as such. True, the normal school of to-day furnishes an excellent training for the superintendent so far as it goes. It does not, however, furnish the necessary scope for the adequate training of a man who is a college graduate and a teacher of experience already. He needs a more vital and searching study, a more thoroughgoing discipline. Certainly the preliminary professional discipline of a man who is more than any other one responsible for the happiness, efficiency and citizenship of the whole rising generation of an entire community, ought to be no less than that of the physician or attorney or engineer. Possibly, we shall ultimately have a small training school for superintendents, under a very strong head, to which teachers will be sent by selection for further study and preparation when they shall have demonstrated that they have supervisory timber in them.

## CHAPTER X.

SECURING AN EFFICIENT TEACHING FORCE—SOME THINGS  
WHICH MUST BE OBSERVED.

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Provision for the training of new teachers will not alone solve the whole problem of the development and retention of an efficient teaching force, although that is perhaps the first feasible step. There are other factors of just as great and perhaps greater importance.

*Present condition of our teaching force.* Limiting our inquiry to teachers in the common or elementary schools, we find that there were employed in such schools last year 2,529 different teachers. Since there were 2,127 schools reported, it is evident that in round numbers there were 400 schools which changed teachers during the year.

Of these 2,529 teachers, 401 had little and in most cases no higher schooling than that of the common school,—blind leaders of the blind. This office is frequently informed of individual cases in which the older pupils of a school are better informed than the person set over them to teach them. Four hundred seventy-one were graduates of normal and 384 of training schools. That is to say, 34 per cent. could be reckoned as in some way trained. Seventy-six were college graduates; 1,197 were graduates of high schools or academies, but not of normal schools. Summarized this gives us the following view of our teaching force:

Of sufficient education but untrained,	50 per cent.
Of sufficient education and training,	34 per cent.
Of neither education nor training,	16 per cent.

Of this force, 95 per cent. is composed of women. So long as this is true, the force utterly and inevitably

lacks permanence and stability. The natural destiny of women is motherhood and homemaking. She will, in the vast majority of instances, give up teaching as soon as acceptable matrimony presents itself. Furthermore, she will not prepare herself for a calling, which she expects to follow only a few years at the longest, with the same thoroughness as a man who expects to make it his life-work. And men, being in competition with women chiefly, will not prepare themselves as thoroughly as they would have to if they knew that they would compete chiefly with men. Under these conditions, teaching in general is not efficient nor can it be. The public more often expresses distrust of the work of schools than satisfaction in their work, but the public is getting vastly better results than it has any right to expect, the condition of the teaching force being what it is. And the people alone are responsible, for the people alone can authorize and provide for the improvement.

In developing an efficient teaching force for the state, then, the matter of fundamental importance is—

*A much larger proportion of men.* The teacher to be entirely efficient must be prepared to make teaching a life-work, with no likelihood that he will ever do any other work. Adequate preparation, seriousness of purpose, permanency, can never be finally secured except the majority of the teaching force be from the permanent bread-winning instead of from the permanent home-making side of humanity.

Nor, on the other hand, can a teaching force be economically trained so long as the product of the normal schools is such that it must be replaced entire in the equivalent of once in seven years.

*Security of position.* Now, in the long run, neither strong men nor strong women as a class will prepare themselves for a life-work in which they may be deprived of their earning power in any year regardless of efficiency.



As I took pains to point out in Chapter II of this part of the report, continuance in position in general depends in the main upon pleasing the children and parents rather than upon efficient teaching. The teachers of thirty-five per cent. of our children have no person in authority over them whomsoever who is competent to pass upon their efficiency as teachers. They continue or fall according as rumor or popular whim in the immediate community dictates. In one case known to this office, a teacher was actually dismissed because she would not furnish a Christmas tree for the children out of her own slender salary. Fortunately for the good name of the state, chapter 50, Laws of 1905, was successfully invoked by this teacher. In the case of the teachers of the other sixty-five per cent., those who are under city or district superintendents, there are comparatively few who would not fall victims to the wrath of any influential citizen whose anger they might have incurred in spite of a clean record as to teaching ability on the books of the superintendent.

The federal government finds it necessary to protect its army and navy, its postal service, its consular and diplomatic service, and many others by rules which make it impossible that any man shall be discharged from his position except for just cause and upon charges specifically affecting his moral character or his efficiency as an employee of the government. He cannot be discharged because some influential private citizen does not happen to like him, nor can he be dropped at the end of the year because a more popular candidate contests his place.

Many city governments have found themselves in a similar situation with reference to their police and fire departments particularly.

A precisely similar course must be taken with teachers. So and only so will the strong consent to become teachers. So and only so will children come to know what they have studied.

Some school boards, particularly in the cities, have already in part achieved this advanced step in administration. One or two only have elected teachers for more than one year at a time. School boards can accomplish much by the exercise of simple common sense and justice, and the cultivation of a stiff spinal column. The condition which is an absolute prerequisite to the development of a strong and permanent teaching force probably cannot be reached, however, except by the pathway of state civil service laws.

*Old age provision.* In the long run neither strong men nor strong women will prepare themselves for a life-work which has in it so little prospect of independent and comfortable old age. Either the strong man or the strong woman will choose instead a calling in which he or she can be reasonably sure of a sufficient fortune to provide for the years of retirement.

The teacher's working life is short, shorter than that of any other calling. The few who continue to teach and fall out of their perilous positions at fifty have little chance to secure other positions, still less at fifty-five and almost none at sixty. The physician or the lawyer is not yet out of professional middle life when the teacher becomes superannuated.

The teacher's salary will not permit a respectable appearance and the laying up of an old age competency, nor is there any likelihood that it will ever be possible to pay salaries to public school teachers sufficient for this end.

The only feasible method of solution is a state teachers' pension system.

There are in existence in America many different kinds of retiring funds for teachers, but, so far as I can learn, two only which are not in the nature of either voluntary or compulsory mutual endowment life insurance. These are the teachers' pension laws of Rhode Island and Maryland.

The former is of particular interest because of the



closely similar extent of the New Hampshire and the Rhode Island state school systems.

The Rhode Island law provides in substance:

“Any person of either sex who on the passage of this act or thereafter shall have reached the age of sixty years and who for thirty-five years shall have been engaged in teaching as his principal occupation and have been regularly employed as a teacher in the public schools or in such other schools within this state as are supported wholly or in part by state appropriation, and are entirely managed and controlled by the state, twenty-five years of which employment including the fifteen years immediately preceding retirement shall have been in this state, may at the expiration of a school year, unless his private contract with his employer shall otherwise provide, be retired by his employer or voluntarily retire from active service, and, on his formal application, shall receive from the state for the remainder of his life an annual pension equal to one-half of his average contractual salary during the last five years before retiring, but in no case shall such annual pension be more than five hundred dollars: *Provided, however,* that no such employment as teacher within this state after this act shall be included within its provisions, unless the teacher shall hold a certificate of qualification issued by or under the authority of the state board of education.

“The state board of education shall make all needful regulations for issuing certificates of qualification and carrying into effect the other provisions of this act not inconsistent with the act itself and shall examine into and determine the eligibility of each and every applicant to receive a pension under the provisions of this act.”

The actual cost to the state of this plan is less than \$10,000 annually, and it is not likely that this cost will be greatly exceeded within a generation. The benefits bound to accrue to Rhode Island and which under a similar law must come to New Hampshire, will be the following:

I. It at once says to young men and young women of native force and ability, "If you will make teaching in our public schools your life-work, you can feel easy about old age. If you continue to teach until a certain time in your life, you will in any case receive a pension sufficient to keep you from the almshouse; but you can feel free to make yourself as efficient as possible, and know that the higher your retiring salary shall be, the higher your pension." The state will therefore be able to secure in every future year a stronger type of young teacher than ever before.

II. The state will tend to retain her best teachers instead of to lose them to better salaried states; for in order to make a change desirable on financial grounds the new employer must be able to offer more than present salary plus future pension. And the fact that the other state has a pension system of its own will not alter the case, for to move out of the state after a residence of several years will be likely to involve loss of pension in both states.

III. The state will tend to retain her strong men teachers in the teaching profession.

IV. In many cases superannuated teachers will be replaced with others more competent, whereas the former would otherwise have been retained out of compassion.

V. Being a *state* instead of a *local* system, it will tend to equalize teaching ability between the rural towns and the cities.

Great railroad systems, too numerous to mention, and other great industrial corporations find it good business to pension their employees. The United States government has found pensions an eminently useful device in securing efficient service, both military and civil. City governments find the same true of their police and fire departments. Munificent private endowment has provided pensions for all college professors. All because it pays. Isn't it worth

the while for the state to do as much for the common schools?

*Protection from the competition of incompetents.* In any private business undertaking, self-interest is ordinarily sufficient to guard against the employment of hopeless incompetency. In public business, self-interest, if it operates at all, usually works in the opposite direction, and in favor of incompetency. The mill owner cannot compete successfully in the market unless he employs competent help. The school board is always under temptation or pressure to employ as teachers personal or political dependents or favorites, or cheap help simply because it is cheap. Their own self-interest works in that direction. For competency the schools and the children must rely upon an enlightened sense of public service in the school board, accompanied by some of the characteristics of the martyr. Such qualities are rare. Hence in all grades and kinds of public service the only available guaranty of competency has been found to be *rigorously enforced minimum statutory qualifications which exclude the incompetent and build up an esprit de corps* which operates as does self-interest in private affairs. Witness the federal army and navy, immigration and sanitary services, to mention only a few.

In our state anybody who can secure the position can lawfully teach school. If the school board employs a woman of loose character so long as she will work cheap, or a drunk and disorderly man,—*both have actually been employed and retained in service*,—because he has a hold upon the community, their action may be morally indefensible but it is perfectly legal.

So long as the trained and competent man and woman must on becoming teachers be in economic competition with the immoral incompetent, as well as with a horde of young girls with neither training nor education, they will not

become teachers, or, having made that mistake, will seek other employment as soon as possible. If the state wishes to develop a permanent teaching force of strong men and women, who have been trained to make teaching their life-work, then the state must protect such men and women from the degrading competition of the incompetent.

Our necessary policy in the building up of a strong and capable teaching force, as it seems to me, involves two essential lines:

I. We must furnish adequate means of training a sufficient supply of teachers.

II. We must attract native capacity to the calling of teacher, (1) by assuring teachers of the absolute domination of the merit system in security of place and promotion; (2) in the absence of salaries permitting an annual surplus above the requirements of a decent standard of living, by assuring the teacher of an old age independence; (3) by protecting the teacher from the competition of incompetents.

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## CHAPTER XI.

### SUPERVISION.

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#### PROGRESS OF DISTRICT SUPERVISION.

The general court of 1899 spread on the statute books a provision for professional supervision of districts composed of two or more towns. By the provisions of the act the state would pay one-half the salary of such district superintendent, the other half to be apportioned amongst the towns forming the supervisory district, or union. The superintendent must hold a permanent state teacher's cer-

tificate, and he must devote his whole time to the supervision of schools.

In its far reaching effects, and its promise of still greater effects, the statute has been exceeded by very few, if any, in the whole history of our school legislation.

#### EARLY ADOPTIONS AND EARLY DISTRICTS.

The law was made a matter of local option so far as the supervisory feature was concerned. It must be adopted by the district meeting before combinations with other districts could be made.

The act became law in the spring of 1899, too late for the insertion of the appropriate article in the warrants for most of the district meetings and too late for the necessary explanation to the voters in the several districts.

By the spring of 1900, however, a considerable number of towns had acted favorably, but they were so scattered for the most part as to make it difficult, and in some cases impossible, to effect combinations of towns. Nine of these very towns still remain with votes on their records authorizing the employment of superintendents, but, owing largely to remoteness from other towns taking similar action, none of them has yet been brought within a supervisory union.

In that year, 1900, three unions were formed, as follows:

1. Marlborough, Troy, Fitzwilliam.
2. Newmarket, Durham, Alton.
3. Salem, Hampstead, Fremont.

Of these towns, Troy, Fitzwilliam and Newmarket remain substantially as at first districted. Marlborough has been so situated that it could have practically its own superintendent. Alton, Durham and Salem have been out of supervision and are now redistricted. Hampstead and Fremont both rescinded.



## DIFFICULTIES IN ORGANIZATION.

Difficulties in organization have been chiefly the following. Many of them still persist, but for the most part they are growing less year by year:

(a) *Lack of compactness.* The sporadic character of the adoptions before mentioned made it necessary to unite towns which were not adjacent and often separated by considerable distances. Though an obstacle to smooth working, this fact has never proved an insuperable obstacle, and towns so situated have usually by force of example brought in neighboring towns with which they could more conveniently combine.

(b) *Unsuitable superintendents.* Although most of the school boards have chosen wisely, so that the state has been peculiarly fortunate in the men who have served as district superintendents, there have been some instances in which the superintendents have been unsuited by temperament, by immaturity in judgment, or by lack of force of character for the peculiar needs of their calling. Of course such men will occasionally be selected. The true remedy would be to try it again with a better man. Unfortunately a few towns have confounded the man with the system and have promptly rescinded.

Fortunately these cases have become rare.

(c) *Time needed for adjustment of superintendents to their work.* Eight years ago district supervision was a new thing in this state. It has taken time for superintendents to become familiar with their problems, both as individuals and as a class. Year by year, however, experience has been accumulating, that experience has been made common property by conferences of superintendents, mistakes are fewer and the superintendent's activities more definite and effective.

(d) *Time needed for school boards to learn how to use*

*the superintendent.* Some school boards in the beginning looked upon the superintendent as an interloper. They would interfere with and hamper him and sometimes positively negative his acts as fast as he took them. Other school boards felt awkward and uncertain of their position and their relation to their superintendent. Both these difficulties were natural and perhaps inevitable. Latterly, school boards are prevailingly coming to get used to their legitimate function as boards of directors or trustees; they are learning how to map out work for the superintendent, and learning how to leave him alone to accomplish results, which is his chief function.

(e) *Time needed for teachers to get used to the visits of the superintendent.* In the beginning many teachers looked upon the superintendent as an enemy, set up to persecute them. This feeling has so far disappeared that it is the rare exception that a competent teacher does not prefer to work under a superintendent.

These have been the chief difficulties in securing smooth and effective working of the districts when once organized. It is on the whole surprising that they have proven of so little final importance. *Of the eighty-eight towns which have at one time or another been under supervision, ten only have rescinded their votes and one of these has since reconsidered and is now under supervision.*

#### OBSTACLES TO ADOPTION.

The chief obstacle to the extension of supervision has been of course the failure of district meetings to adopt the article. The obstacles in the way of such adoption have been chiefly the following:

(a) *Inertia.* This has been by far the greatest obstacle. Let well enough alone; don't embark on any new venture; what was good enough for the fathers is good enough for the children. This inertia has found its ready expression in



a motion "To pass the article," without discussion, a motion which nearly always prevails.

(b) *Lack of understanding.* A new venture needs much explaining. The voters, long accustomed to doing without a superintendent, could not understand his use. "What is the need of a superintendent?" has been and still is the expression of this lack of understanding. Such people are not hostile; they only wait to be convinced. It is significant that wherever the proposition of the state has been explained to a representative audience, favorable action at the following school meeting has seldom failed; and there is but one case on record when the matter has been explained at the meeting itself by a representative of the state, the voters being present, in which the district has failed to take favorable action.

(c) *Misunderstanding.* "It is a sacrifice of local control." Of course this is not so at all. The superintendent is given no powers, with the express purpose that he shall be under the full control of the school board and the district. This is sometimes an obstacle to efficient work on his part, but it compels him to win the confidence of school board and people. It also matches the responsibility of local self-government to its powers.

"It will be a burdensome expense." As a matter of fact the cost of a superintendent is seldom as much as that of an extra teacher, and in many instances he saves his salary outright through better care of text-books and other apparatus. In the long run supervision always more than pays for itself by giving better results for the money expended. Where the state pays one-half the salary and the other half is divided between three or four districts, manifestly the cost to any one district cannot be great.

(d) *The magnifying of petty obstacles.* Of course the plan is not perfection, and if we wait for everything to be perfection in this world before acting, we shall make little progress.

(e) "*It all depends upon the man.*" Manifestly, but this is not reason for rejection. Every kind of action depends for its success upon those who act. The true principle is, If you don't succeed with the first man, give it a fair trial with another.

(f) "*It has been tried and proven a failure.*" Up to the close of the last school year, it had been tried by eighty-eight towns, and ten of these had rescinded. Of that ten, one has since reconsidered its rescission and is now under supervision; and four of the others had tried it but one year. It must be remembered, too, that rescission has usually been carried by only a small margin. Seven other towns have dropped out by action of their school boards. Of these, three have returned under supervision. Three others have been forced out by the breaking up of the combination to which they belonged; one of these has since been redistricted. Hence, while but fifteen districts altogether have tried supervision, for one reason or another dropped out, and still remain out, seventy-three have tried it and still remain.

Furthermore, while the system has been working out in New Hampshire, both Maine and Vermont have adopted similar laws.

(g) "*Could n't see results where it has been tried.*" Very likely. Perhaps the objector does not know where to look for results. Again, it takes more than one year or yet two years to produce the best results.

(h) "*They may need a superintendent in the cities, but we do not need one in the smaller towns.*" That is equivalent to asserting that the children in the smaller towns do not need as good schools as do the children of the cities.

#### RECENT PROGRESS.

(a) *In adoptions.* During the first four years after the passage of the law, thirty districts were brought under su-

pervision, eight of which for one cause or another dropped out. During the following four years, four of the dropped towns have been recovered and sixty others have been added. Of the last, ten have dropped out or been forced out.

(b) *A better class of superintendents.* Demand has created a supply and a better class of men are obtainable as superintendents.

(c) *Better understanding of work.* School boards, superintendents and teachers have better learned how to work together.

(d) *Awakening of public opinion.* Successful supervision in one town has awakened interest in other towns, not only in supervision as a method of securing good schools, but, what is more important, in good schools themselves. If the reader will take a map of the state, he will see that the towns under supervision lie in nearly continuous lines or in bunches, showing that supervision in one town has usually commended itself to the people of adjacent towns.

Cities and towns under supervision:

Manchester,	Charlestown,
Nashua,	Claremont,
Concord,	Lebanon, Town,
Dover,	Lebanon, High School,
Portsmouth,	Rindge,
Keene,	Derry, Town,
Laconia,	Peterborough,
Rochester,	Derry, Special,
Franklin,	Greenland,
Somersworth,	Milford,
Penacook,	Durham,
Fitzwilliam,	Hinsdale,
Newmarket,	Jaffrey,
Troy,	Plainfield,

Dublin,	Raymond,
Milton,	Orford,
New London,	Piermont,
Newport,	Stratford,
Wakefield,	Tilton, Town,
Wilton,	Warner,*
Amherst,	Warren,
Boscawen, Special,	Antrim,
Colebrook, Special,	Salem,
Hanover, Town,	Swanzey,
Hill,	North Hampton,
Hillsborough, Town,	Columbia,
Hillsborough, Special,	Concord, Town,
Hopkinton,	Atkinson,
Newington,	Haverhill,
Northumberland,	Woodsville,
Epping,	Bath, Town,
Pembroke,	Bath, Special,
Pittsfield,	Ashland, Special,
Alton,	Holderness,
Hudson,	Meredith, Town,
Stratham,	Meredith, Special,
Walpole,	Campton,
Westmoreland,	Rumney,
Tuftenborough,	Woodstock,
Wolfeboro,	Northfield,
Allenstown,	Tilton, Union,
Berlin,	West Lebanon.

Towns formerly under supervision which have withdrawn by rescissions:

Hampstead,	Alstead.
Fremont,	Langdon.
Farmington, Special,	Sunapee.
Henniker,	Danbury.
Franconia,	Enfield.

Towns formerly under supervision which have withdrawn by action of school boards:

Marlborough,	Rye,
Winchester,	Bradford.

Towns formerly under supervision which have been forced out by action of neighbors.

Harrisville,	Littleton.
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#### PROGRESS IN OTHER STATES.

The New Hampshire law as it stands was enacted with the experience of Massachusetts alone as a guide. It was probably an improvement on the then existing Massachusetts law and the latter was subsequently modified materially. Toward the close of the decade which has elapsed since 1899, both Maine and Vermont have adopted laws which are in essential particulars better than ours, and New York is about to adopt an act similar to that of Vermont.

In Massachusetts, the enabling act authorizing towns to combine for the purpose of supervision was passed in 1888. By 1900, 96 per cent. of all the children of the state were residing in cities or towns under professional supervision. In that year supervision was made compulsory upon all towns and cities of the state, the same to take effect in 1902.

The state pays \$1,250 toward the superintendent's salary, which is fixed at \$1,500 as a minimum.

It is said by the Massachusetts State Board of Education, that during the period of twelve years which elapsed between the enabling act and the compulsory act, there was scarcely an obstacle conceivable which was not proposed by the ingenious opponent. "The law was a scheme to provide college graduates with employment; it was an unwarrantable interference with local self-government;

it would afflict the state with a horde of crack-brained theories; it would, in short, be a perfect Pandora's box of evil spirits." Still the towns went steadily on adopting until nearly the whole state was under supervision by local option. During the six years which have passed since supervision became universal, there has been scarcely a breath of opposition. It has made teaching vastly more effective; it has made schools vastly better adapted to the communities which they were primarily designed to serve; it has greatly improved attendance conditions. It has resulted in a great improvement in the comfort and hygienic conditions of the schoolhouses.

It is doubtless true that the Massachusetts towns which had to divide but \$250 of the superintendents salary amongst themselves were much more willing to adopt than New Hampshire towns which have had to share one-half the superintendents salary among themselves, or \$750 on the same basis as that of Massachusetts. \*

The Maine supervisory law has recently been remodeled so that it corresponds more closely with the New Hampshire law. The essential features of the Maine law which are different from that of New Hampshire are: supervisory unions must continue three years unless sooner dissolved by a two-thirds vote of the joint committee; the state pays two-thirds of the salary of the superintendent up to the extent of \$800. In practice, the salaries of our superintendents being what they are, this feature is not very different from that of New Hampshire. Under the Maine law, however, in the last three years about thirty supervisory unions have been established. The state superintendent of Maine informs me that the advantages are sufficiently obvious to Maine towns to make adoptions almost entirely spontaneous, and that the state has been embarrassed by the rapidity of the formation of districts rather than otherwise.

The Vermont supervisory law was remodeled by the leg-



islature of 1906. The Vermont statute is a distinct step in advance. The supervisory unions can be formed by action of the several school boards without any action by the district. Unions cannot be dissolved until three years from the date of formation, except by a two-thirds vote of the joint committee. The state pays \$1,000 of the superintendent's salary. The minimum salary is \$1,250. The superintendent has certain statutory duties such as the prescription of the course of study, the purchase and distribution of all books and supplies, and the dismissal of teachers for cause. The adoptions in Vermont within two years have been twenty-six unions comprising one hundred and ten towns. The rapidity of the adoptions in Vermont is due, doubtless, mainly to two factors: first, the large proportion of the salary paid by the state; and second, the fact that no action by the district meeting is required.

#### WHAT DISTRICT SUPERVISION IS ACCOMPLISHING.

In the first place it should be understood that district supervision does not purport to be a method of revolutionizing schools and accomplishing the marvelous. The professional schoolman has occasionally appeared upon the scene who has proposed with much flourish of trumpet to produce the system of public schools which would usher in the millennium. Such men have usually been professionally short-lived in any community, and have almost invariably done much more harm than good.

On the other hand, it can not be claimed that, in the ten years during which district supervision has been an established policy of the state, it has accomplished any revolution. It has been rather working a steady and patient improvement in the results produced by the schools as they are. It has had very formidable obstacles to overcome, extending all the way from the prejudice of the



public to hopeless incompetency of teachers. In the main, it has surmounted them all and, in my judgment, has justified itself by its fruits.

I. It has accomplished a distinct improvement in the regularity of the attendance of children at school. No matter how good or how poor your school may be, it cannot accomplish its purpose unless the attendance of children is regular. Practically every district superintendent has begun his career by patiently working at this problem. In fifteen towns which were among the earliest under supervision, the average percentage of attendance for two years preceding the coming of the superintendent was 86.5. In the same towns during the school years 1906-1908, the average percentage of attendance was 90, making a gain of 3.5 points in 100. The average gain for the state during the same period was 1.4. It should be understood at the same time that the actual improvement in this item is really much greater than the figures show. The prevailing tendency of the teacher who is without supervision is to keep her register in such a way that the percentage of attendance shows up to be much higher than it really is. One of the first steps of the district superintendent has been to see that the register is correctly kept, and this step in most cases results in a lowering of the figures. Hence, the improvement noted above is really considerable less than the true improvement, since the lower of the two figures in comparison is higher than it should properly be.

II. The district superintendent has in the great majority of cases succeeded in cleansing and otherwise bettering schoolhouse conditions. In a very large number of instances he found one-room schoolhouses, and even larger buildings, suffering from the neglect and the accumulated dirt of years. He contrived to see that the buildings were renovated at the outset and afterwards kept clean.

He often has found that the moral conditions about the schoolhouse were deplorably bad. In a patient but vigor-

ous and persistent campaign for moral decency and cleanliness, he and his teachers in co-operation have often achieved wonders.

In many instances he has succeeded in interesting the teachers, children and school board in the whitewashing, tinting and decorating of schoolhouse walls, so that the room has been changed from a barn to a dwelling place.

The writer has in mind at this moment, two schools which illustrate the above.

The first case is that of a small village schoolhouse. I visited this school personally about a year and a half prior to the coming of the superintendent. It was grossly unsanitary, grossly unclean and overcrowded to about three times its normal capacity with the youngest children. I have no doubt that that schoolhouse had been directly responsible for the deaths of many children. The next time I visited this school, not quite one year after the superintendent's arrival, I found it clean, wholesome, still somewhat overcrowded, in charge of two teachers (there had been but one before) whose teaching was correct and whose school management was sound and wholesome. To-day, after the passing of another year and a half, the schools of that whole community are about to be housed in a modern school building at a cost of over \$25,000. The superintendent is very far from having been entirely responsible for this improved condition of affairs. District supervision, however, and this superintendent in particular, do deserve much credit, for it was through them that the first necessary steps were taken.

The other case was that of a small school in a one-room rural schoolhouse in a back town. Prior to the superintendent's coming this and all other schools in town were in the typical condition of neglect. The building was comparatively new and, at bottom, perhaps as good as a building might reasonably be expected to be. It was, however, dirty and in many respects indecent. The teaching was a

farce. Within six months after the superintendent's coming an intelligent high school graduate was teaching, and learning daily from the superintendent how to teach better. The schoolhouse was sweet and clean inside and every trace of indecency had been removed.

Cases similar to the above might be repeated for nearly every supervisory union which has been formed.

III. In many instances the superintendent has effected economies in the financial side of the administration of the schools, not infrequently, if the reports of school boards are to be credited, saving the town's entire portion of the salary outright. Amongst other directions in which superintendents have effected such savings have been the following:

In the purchase of text-books and supplies the superintendent is ordinarily much more conversant with the needs of the schools and with the most advantageous placing of orders than the average school board member is likely to be. What is bought is, therefore, bought usually at a lower price when the superintendent is consulted.

An efficient superintendent usually succeeds in gathering up a considerable stock of text-books, paper, pencils, etc., which have been laid away in the closets of different schoolhouses and forgotten. One case is on record in which the district superintendent within a month of his arrival saved \$50 on an order for text-books and supplies in this way.

The most needed lines of text-books are the cheapest. The school board is prone to invest heavily in frequent changes of expensive books which are not needed. After consultation with the district superintendent they commonly purchase the more needed, but less expensive line of books. In towns which are under good superintendents there is also a tendency to use fewer text-books and to depend more upon teaching.

In towns in which school boards rely upon the superin-

tendent's judgment, I find that there has been a notable decrease in the habit of purchasing expensive but useless pieces of apparatus, so prevailing a few years ago. It has been not an uncommon occurrence for a school board member, overpersuaded by a glib agent, to pay an extravagant sum for some patent apparatus for the use of the schools, which, in the great majority of cases, never comes to any educational use whatever. Professional schoolmen can rarely be persuaded either to purchase or to recommend such apparatus. The apparatus really needed for school-rooms is inexpensive, but seldom found.

In this day of free text-books and free supplies, there is often a lamentable waste through the neglect of teachers and children, neglect of the care of books and waste of other supplies. The effect is doubly disastrous for it is not only an extravagant use of money, but also tends to develop in children the very opposite of those habits of thrift and respect for public property which they should learn in school.

In general, the district superintendent accomplishes very considerable savings in expenditure of school money through his special knowledge of values and through his ability to look after details, or, what amounts to the same thing, he saves money which is non-productive and makes it productive. His ability to save, however, of course, depends on: first, whether or not the school board is willing to consult him; and second, whether or not the schools have previously been conducted on economical or parsimonious lines. Generally speaking, school boards do consult the superintendent concerning all strictly educational expenditures, although there are some notable exceptions to this rule. In some cases they make him their financial, as well as educational, executive. In case the previous administration of the schools has been really economical, of course, there is no room for any saving; and in case the previous management of the schools has been parsimonious,

there will, of course, be an increase in expenditure if there are to be any good schools.

Another economy resulting from the employment of a superintendent, while not strictly financial, resolves itself into terms of money in the end. I refer to the great saving made by increasing the regularity of attendance. It appears that, although there has been a general improvement in regularity of attendance in all schools, yet in those towns which have adopted the supervisory plan the increased regularity of attendance is more than double the increase for the state as a whole. In the fifteen towns first placed under supervision, there has been an improvement in attendance of 3.5 points on a scale of 100. The average for the state is 1.4 points on a scale of 100. In a town having a membership of 100 pupils at an average school year of thirty weeks, this is equivalent to a financial saving of \$47.25. In the specific case of one town which went under supervision in 1904, the average attendance has been raised from 80 per cent. to 93 per cent. This increase is equivalent to a saving of \$253.11, or rather is equivalent on this one point alone to getting \$253.11 more value out of the same investment, and the cases could be multiplied. The proportion of the superintendent's salary paid by the town just referred to, is \$195. It is certainly not worth while to maintain schools at all unless the children attend regularly. Unless they do so, we do not begin to get our money's worth out of our investment in schools. It is good business to add a little more and thus get the full return on our money.

IV. Of course the principal benefit derived from district supervision, in its value far transcending all others, centers around the teaching itself. Unfortunately we cannot express this benefit in dollars and cents nor in any other numerical form. While the improvement in the results of a schoolroom are not usually immediately apparent, and are seldom apparent to the casual observer even within



a year, as time goes on and the process of systematizing the work and training teachers to do the work is not broken, the results become very manifest in: (1) a conspicuous mental awakening in the pupils; and (2) distinctly improved scholarship. Such improvements have been especially marked in reading, arithmetic, the use of good English and geography.

*Reading.* In towns not under supervision, with here and there an exception, the process of teaching children to read consists chiefly in teaching them to pronounce words. It is not uncommon in such schools to ask a ten-year-old boy what he has been reading and to find that he answers only with a vacant stare, evidently failing utterly to see that the question has any point. The superintendents have been advised and urged to make this subject the initial point in their campaign for improvement, for upon reading depends absolutely the whole superstructure of education. And with but few exceptions the superintendents have almost at once succeeded, in most schools, in getting some real reading done, beginning with the smallest children.

Their usefulness here is particularly manifest in those towns which are obliged to employ as teachers persons entirely without any professional preparation. The teaching of reading is, beyond all other teaching, usually that about which such persons are most ignorant. They are not to blame. In most cases they are worth all the money they receive. With no superintendent on the ground, they proceed in the teaching of this very important subject as best they can, and their best is usually simply the training of children to pronounce words. In a very brief time a capable superintendent can show a teacher of this sort enough about the principles of the teaching of reading to enable her to achieve very satisfactory results.

*Arithmetic.* Under the guidance of superintendents there has been a marked recovery of mental arithmetic

from its long period of disuse; there has been a marked tendency to cut down the ridiculously large number of useless topics to the dimensions of the fundamental and useful portions of the science with consequent gains in the direction of thoroughness. Many teachers, particularly untrained teachers, have been led to reduce the emphasis upon dollars-and-cents arithmetic to its proper dimensions and to emphasize the solution of practical problems chosen from the daily life of the pupil.

*English.* The aim of superintendents in the very important matter of the cultivation in children of the power of using their mother-tongue intelligently, has been along the lines of a more rational and, consequently, more thorough teaching of spelling; of the training of children in the use of language by actual oral and written composition; of the divesting of the study of English grammar of its meaningless formalism on the one hand and its impracticable substitutes on the other.

*Geography.* In most places the district superintendents have found the teaching of geography a matter of assigning certain paragraphs, longer or shorter, to be memorized verbatim, followed by the subsequent repetition by the teacher of questions from the foot of the page or the end of the chapter. Of necessity, under such method, the outcome is merely an unrelated jargon of the names of capitals, mountain chains, capes and peninsulas without the remotest idea that there is such a thing as the understanding through the study of geography of the earth as the dwelling place of man.

The superintendents are working a change in this matter in the direction of the study of geography as a science of reality. Instead of learning to recite a catalogue of names, the pupils study first their own home town and its surroundings, its chief industries, etc. Proceeding from a real knowledge of their own surroundings, they are better equipped to study in a similar way and to understand the life, the industries, the institutions of other lands.



I have dwelt upon these four common school subjects not because the district superintendents have limited their attention to these and in full realization of the fact that individual superintendents have devoted more attention to other subjects. I mention them because they have been the main lines through which the superintendents have aimed to secure more efficient teaching; because in them the superintendents have perhaps secured their best results; and because they best illustrate the general spirit of the superintendent's work so far as it has to deal with teaching itself. That spirit may perhaps be properly summarized as an effort to bring life into the schoolroom and drive bookishness, as such, out; to make schoolroom work deal with realities and to produce mental growth and capacity in children, rather than a pleasing fund of information.

V. *Discipline.* The effect of supervision has been distinctly to improve the condition of discipline in the schools. In fact, in one or two cases in which towns have dropped out of supervision temporarily, there has been such a prompt recrudescence into the old ways of misbehavior that the townspeople have come to realize sharply, as they probably otherwise would not have done, the value of the presence of a superintendent in town for this cause alone. The improvement is probably to be accredited chiefly to the following factors:

District supervision brings back into the schools something of the virile element which used to be a distinguishing mark and which seems to be about as necessary in the maintenance of permanently good discipline as do army, navy and police forces for the guaranty of law and order in society. A turbulent boy is apt to think twice if he knows that a man will be on hand to-morrow, or day after to-morrow, or next week even, to deal with him. On the other hand, the presence of the superintendent in the schools is some guaranty of an understanding of the boy-life of the town from a boy's point of view.

Most superintendents are able to counsel teachers effectively in the direction of a more wholesome school management. Much the same process is now taking place in the supervisory districts in this respect which has come very nearly to completion in the cities. In the modern village and city school the problem of discipline is well-nigh negligible as compared with what it was twenty-five years ago,—a result which has been brought about in the main by the effective introduction of more rational principles of school management.

The district superintendent from his peculiar position makes an excellent arbitrator.—provided he is of the right personal temperament. He holds a position midway between the school board and the teacher which gives him an excellent opportunity to nip in the bud those incipient quarrels between teachers and parents which are so often the bane of all effective school work. He is thus able to bring parents and teachers to a better understanding; to deal with parents dispassionately, causing them to see the acts of their children in a light which the teacher could not possibly throw upon them; and in this and in manifold other ways to prevent all but the most serious matters being brought before the school board for final adjudication and settlement.

VI. Finally, not the least of the benefits of supervision has been the upbuilding of a better educational spirit in the community, a spirit of increasing interest in schools and a spirit of increasing broad-mindedness toward school matters. It has had a tendency to prevent the sometimes bitter contentions of the different warring cliques in town. The writer has more than one case in mind, in which three- or even five-cornered fights were always to be expected upon every school question which came up, where the advent of the superintendent, without any particular action upon his part, has had the effect of transferring the battle-field to other than educational interests.

It should not be understood that this record of achievement is universal. On the contrary, there have been some cases in which the superintendent has proved so ill-adapted to his work, or the school board has been so entirely unwilling to allow him to accomplish anything, or the people have been so hostile to the whole notion, that the schools have been hampered rather than helped. Such cases have been extremely few.

In general, the superintendent has succeeded in greatly increasing the ratio of scholastic achievement in the pupils to money invested in schools.

TABLE No. 49.

SUMMARY OF ADOPTIONS OF SUPERVISION IN NEW HAMPSHIRE, WITH PRESENT SALARIES OF SUPERINTENDENTS, AND AMOUNTS PAID FOR LATTER BY TOWNS AND THE STATE, CORRECTED TO JANUARY 1, 1909.

Year of adoption.	Town or city.	Amount paid by town.	Amount paid by state.
1855	Manchester,	\$2,300.00	.....
1869	Nashua,	2,000.00	.....
1874	Concord,	2,000.00	.....
1881	Dover,	2,000.00	.....
1885	Portsmouth,	1,850.00	.....
1889	Keene,	1,200.00	.....
1894	Laconia,	1,300.00	.....
	Rochester,	1,000.00	.....
1897	Somersworth.	1,000.00	.....
1900	Franklin,	1,400.00	.....
	Penacook,	150.00	\$150.00
	Durham,	150.00	150.00
	Hampstead,*	.....	.....
	Fremont,*	.....	.....
	Marlborough.*	.....	.....
	Fitzwilliam,	172.50	172.50

Year of adoption.	Town or city.	Amount paid by town.	Amount paid by state.
1900	Newmarket,	\$325.00	\$325.00
	Salem,†	250.00	250.00
	Troy,	172.50	172.50
1901	Dublin,	125.00	125.00
	Epping,	275.00	275.00
	Pembroke,	270.84	270.84
	Pittsfield,	270.83	270.83
1902	Alstead,*	-----	-----
	Alton,†	300.00	300.00
	Hudson,†	200.00	200.00
	Stratham,†	150.00	150.00
	Walpole,	360.00	360.00
	Westmoreland,	240.00	240.00
1903	Langdon,*	-----	-----
	Tuftenborough,	172.50	172.50
	Winchester,*	-----	-----
	Wolfeboro,	468.75	468.75
1904	Allenstown,	108.33	108.33
	Berlin,	2,200.00	-----
	Charlestown,	195.00	195.00
	Claremont,	780.00	780.00
	Lebanon, Town,	165.00	165.00
	Lebanon, High School,	390.00	390.00
	Rindge,	155.00	155.00
	Randolph,	187.50	187.50
1905	Derry, Town,	375.00	375.00
	Derry, Special,	75.00	75.00
	Enfield,*	-----	-----
	Farmington, Special,*	-----	-----
	Franconia,*	-----	-----
	Greenland,	125.00	125.00
	Littleton,*	-----	-----
	Milford,	350.00	350.00
	Milton,	300.00	300.00
	New London,	171.00	171.00
	Newport,	684.00	684.00

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Year of adoption.	Town or city.	Amount paid by town.	Amount paid by state.
1905	Sunapee,*	-----	-----
	Wakefield,	\$300.00	\$300.00
	Wilton,	250.00	250.00
1906	Amherst,	150.00	150.00
	Boscawen, Special,	75.00	75.00
	Bradford,*	-----	-----
	Colebrook, Special,	212.50	212.50
	Danbury,*	-----	-----
	Hanover, Town,	135.00	135.00
	Henniker,*	-----	-----
	Hill,	225.00	225.00
	Hillsborough, Special,	250.00	250.00
	Hopkinton,	250.00	250.00
	Newington,	100.00	100.00
	Northumberland,	212.50	212.50
	Orford,	190.00	190.00
	Piermont,	135.00	135.00
	Rye,*	-----	-----
	Stratford,	212.50	212.50
	Tilton, Town,	200.00	200.00
	Warner,	250.00	250.00
	Warren,	190.00	190.00
1907	Ashland, Special,	220.00	220.00
	Atkinson,	150.00	150.00
	Bath, Town,	150.00	150.00
	Bath, Union,	100.00	100.00
	Columbia,	212.50	212.50
	Concord, Town,	250.00	250.00
	Harrisville,*	-----	-----
	Haverhill, Town,	250.00	250.00
	Haverhill, Woodsville,	250.00	250.00
	Holderness,	220.00	220.00
	Meredith, Town,	220.00	220.00
	Meredith, Special,	165.00	165.00
	North Hampton,	200.00	200.00
	Peterborough,	250.00	250.00

Year of adoption.	Town or city.	Amount paid by town.	Amount paid by state.
1907	Swanzey.	\$200.00	\$200.00
1908	Campton.	300.00	300.00
	Hillsborough, Town.	150.00	150.00
	Hinsdale.	275.00	275.00
	Jaffrey.	250.00	250.00
	Lebanon, West,	150.00	150.00
	Northfield.	150.00	150.00
	Plainfield.	150.00	150.00
	Raymond.	150.00	150.00
	Rumney.	240.00	240.00
	Tilton, Union.	350.00	350.00
	Woodstock.	180.00	180.00

\* At one time in supervisory union and subsequently dropped out.

† At one time in union, then dropped out, and finally reunited.

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## CHAPTER XII.

### SUPERVISION—DISCUSSION OF THE EXISTING LAW WITH SCHOOL BOARD OPINIONS.

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During the past summer I sent the school boards in the various towns of the state the following circular of inquiry :

#### PROFESSIONAL SUPERVISION.

The coming session of the legislature will mark the close of a full decade since the enactment of our present supervisory law. The fact alone admonishes us to inquire whether the experience of the decade ought not to be scrutinized to see if that experience does not dictate changes in the direction of the improvement of the statute.

The New Hampshire law as it stands was enacted with the experience of Massachusetts alone as a guide. It was



probably an improvement on the then existing Massachusetts law and the latter was subsequently modified very materially. Toward the close of the decade in question, both Maine and Vermont have adopted laws which are in essential particulars probably better than ours, and New York is about to enact a law similar to that of Vermont. Connecticut and Rhode Island at an early date enacted statutes similar to those in Massachusetts and New Hampshire, but not, I think, in any material sense an improvement on our own present law.

A summary is here given of the present New Hampshire law compared with the present laws of Massachusetts, Maine and Vermont.

#### New Hampshire.

Supervision a matter of local option. Must be voted by the district. District may withdraw at any annual meeting.

State pays one-half superintendent's salary, practically without limitation.

Superintendent must hold permanent state teacher's certificate.

Superintendent has no statutory powers.

#### Massachusetts.

Supervision compulsory upon all towns.

State pays five-sixths of superintendent's salary. The superintendent's salary cannot be less than fifteen hundred dollars.

Superintendent must hold certificate of state board of education.

Superintendent has no statutory powers.

#### Maine.

Supervision a matter of local option. Supervisory union must continue three years unless sooner dissolved by a two-thirds vote of joint committee.



State pays two-thirds salary of superintendent, provided, however, that the sum so paid for the benefit of a single union of towns shall not exceed eight hundred dollars per annum.

Superintendent must hold state certificate. Superintendent employs teachers, subject to approval of school board.

Vermont.

Supervisory unions are formed by action of several school boards. No action required by district. Unions cannot be dissolved until three years from date of formation, except by two-thirds vote of joint committee.

State pays one thousand dollars of superintendent's salary regardless of amount paid by town. The minimum salary is one thousand two hundred and fifty dollars.

Superintendent must hold state certificate.

Superintendent by law prescribes course of study, purchases and distributes all books and supplies, may dismiss teachers for cause.

Subject to fine for accepting gratuity.

I. Ought the state to bear a larger proportion of the salary of the superintendent? If so, what proportion?

II. Ought the law to be so changed as to require towns voting for supervision to make a longer trial than one year? If so, how many years?

III. Ought the law to be so changed as to define the powers and duties of the superintendent?

IV. If so, briefly indicate the powers which you would lodge in the hands of the superintendent.

V. Ought the law to be so changed as to fix a future date prior to which all towns must unite for supervisory purposes?

VI. Please indicate any other changes which your experience indicates ought to be made in this law.

VII. The state superintendent would be glad to have you make here a memorandum of any changes in, or additions to, our school laws which you deem expedient.

Follows a summarized statement of the answers to the first five questions. Question six does not admit of summarized treatment and, as a matter of fact, very few responses were made.

## I.

Yes, 113.	No, 46.
Two-thirds,	50
Three-fourths,	6
Three-fifths,	14
Four-fifths,	2
One-half to two-thirds,	1
Two-thirds or three-fourths,	2
Two-thirds or three-fifths,	4
Three-fifths in small towns,	1
Two-thirds in small towns,	1
Two-thirds or \$1,000,	1
\$1,000,	7
Whole,	8
Subject to state superintendent,	1
Towns under 1,500, three-fourths; larger towns, two-thirds; cities, one-third,	1
Grading according to taxation,	4
Additional appropriation for poor towns,	1

## II.

Yes, 152.	No, 29.
2 years,	16
3 years,	93
4 years,	2
5 years,	14
10 years,	1

100 years,	1
2 or 3 three years,	11
3 or 5 years,	3
Compulsory,	1

## III.

Yes, 76.

No, 50.

## IV.

Employ teachers,	20
Discharge teachers,	16
Recommend teachers,	2
Employ and discharge teachers subject to approval of board,	19
Hold teachers' examinations,	4
Purchase text-books and supplies,	28
Purchase supplies subject to board,	4
Distribute text-books and supplies,	5
Prescribe course of study,	24
Grade schools,	5
Power to enforce all he is supposed to recommend,	2
Enforce truant laws,	4
Control of schools subject to board,	5
Full charge of school work,	4
All duties of board,	3
Meet with board to advise,	4
Fine for accepting gratuity,	2
Define but not enlarge powers,	1
Powers and duties defined by supervisory board,	1
Powers and duties as defined by state superintendent in report for 1906,	1
Degree of corporal punishment,	1
Discipline,	2
Vermont law,	5
Maine,	1
Maine and Vermont combined,	1

Abolish school board,	1
Locate schools,	1
Visit schools and parents,	1
Have two ballots to prevent deadlock,	1
Make annual report,	1
Report to board monthly,	1
Monthly balance sheet showing expenditures,	1
Advisory not final,	1

## V.

Yes, 77.

No, 87.

It is significant of the attitude of school boards toward the principle of district supervision that after ten years' trial only four out of two hundred answers express themselves as in any way opposed to the principle. Characteristic answers to each of the seven questions are here given. It should not be understood that the state superintendent necessarily endorses any of the answers here given. They are set forth in an entirely reserved spirit, simply for the sake of expressing the general drift of the feeling of the school boards as manifested by these answers.

## I.

"Yes. The whole salary."

"The state should bear the whole salary of the superintendent."

"Yes. Two-thirds, so as to help the poor towns secure better work from their poor teachers."

"In some cases yes, and in other cases no. I do not consider it necessary in cities or the larger towns that the state should pay any part of the superintendent's salary. On the other hand, in the smaller towns with a small population and low valuation, the proportion paid by the state should be larger, possibly in special cases up to the limit of the Maine law, that is, two-thirds of the superin-

tendent's salary. For an average I believe our law is preferable, but if the state pays only an equal amount to that raised by the towns, there might not be enough to provide a reasonable salary for a superintendent."

"The argument against supervision is cost to towns supervised. If we can reduce the cost, we can reduce the validity of the argument. The cost is not onerous to some towns as it is. Let the state pay as much as possible."

"I think the state should pay two-thirds salary."

"I think supervision would meet with much less opposition in towns like this, if the state paid three-fourths of the superintendent's salary."

## II.

"Yes. Three to five. Vermont plan as to dissolution meets my approval."

"Yes, not less than three years. A district once formed, no one town should be allowed to withdraw without the consent of the other towns forming the district."

"I do not think so. A town is somewhat like an individual and does better work if satisfied with conditions brought about of its own opinion."

"Yes; five."

"Yes. One year is not long enough for a thorough trial. In fact, with the school year proper beginning in September, and the town meeting coming in March, there is little more than two-thirds of a year left for the trial, which is not always enough to properly see results. Moreover, there is not enough permanency to the scheme with the one-year term. The district formed this year may be broken by next year by one town giving up supervision, and the other towns may have trouble in forming a new district."

"Yes. Five years is none too long a time to give supervision a fair trial."

"Yes, for not less than five years. But I think that if

the state paid the salary, there would be no need of any law on this point."

"Yes, at least three years so as to give it a fair test."

### III.

"Yes."

"Yes. As the law now is the superintendent has no power except that given by the school board."

"Yes. As it is now, it is a haphazard, go-as-you-please sort of thing."

"Yes, some of them. Why hire a man who knows and then say that he shall take his cue from those who do not know—as much?"

"I think all school officers should have some definite duties and powers."

"I think if his powers and duties were defined in a general way by the law there would be much less chance of friction in cases where the superintendent, or the board of education, was inclined to be 'cranky.'"

"Doubtful. Festina lente."

### IV.

"If any, nominate teachers, subject to approval by board; make courses of study, subject to approval by board."

"I think the local expense with the present *weakness* of the law (which I think is well understood) has and does deter general adoption of school supervision in New Hampshire. If the state can be induced to pay all the supervisor's salary, I believe that supervision would generally prevail; if accompanied with a five-years' term, when once adopted, would continue. This, I believe, would be far better than compulsory supervision."

"The employment of teachers, selection of books and supplies, and the general control of the teacher and school



with the approval of the board of education. It should be his duty to make the annual reports."

"Superintendent should have full charge of details in schoolroom, but all major changes and affairs should be subject to school board."

"Prescribe course of study, purchase and distribute all books."

"Power over attendance, hiring of teachers, and buying supplies."

"The power to select teachers, so that superintendent and teachers may work harmoniously."

"It is desirable that there should be a clearer definition of at least a few of the principal duties of the superintendent, say, in line with your circular on the subject, but I do not feel prepared to say just what duties should be designated. As you say in your circular, a man can be held fully responsible for that over which he has full control. I am not an advocate of board or committee direct control of any line of work, as it tends to a shirking of responsibility. I believe in a single head to be personally responsible for the results, in which case he must have considerable power in the appointing and the removal of those under him. In school management I would like the direct interference by the board to be removed as far as possible except such amount of oversight as may show to them what results are being obtained."

"Recommend all teachers and text-books subject to vote of school board."

"He should meet with the board to advise on all matters, and on all ballots have two votes, so as to prevent a deadlock."

"He should hire all teachers and they should be subject to his control alone. He should purchase all books and supplies subject to a veto by the school board."

"Purchasing of supplies also the engaging of teachers."



## V.

"No. Let the help from the state be so liberal that it will not be burdensome on the towns and then let them accept it of their own accord."

"I do not just believe in supervision in a town like ———, because we need all the money we can get to pay teachers and pay other expenses."

"Yes. If compulsory, fix a future date when it shall be, but some time in the future as it will be difficult to immediately make the change satisfactorily."

"That would depend upon what fixed laws we had in regard to the superintendent."

"I always considered the lack of efficient supervision the chief defect of our school law. I would have such action by the towns compulsory *at once*."

## VI.

"I think a superintendent should not only be able to hold a state certificate, which he could do by passing examination, but should give proof that he had taught four years successfully, for some are good scholars but not good teachers."

"Superintendent dismissed for cause,—cause first made known to state officers and pronounced sufficient by them for dismissal."

"There should be some definite rule in regard to the duties of superintendents so that school boards would know what to require of them."

"After a little longer trial, yes."

"Some people think the superintendent has a 'rake off' on supplies, let him be subject to fine for such gratuities."

"The state superintendent should hire all district superintendents, subject to a veto by school boards."

## VII.

“The literary fund should be distributed not according to the number of school children, but according to the number of days’ attendance in each school district. The state superintendent should hold in each county at least two examinations for teachers each year, and no person not holding a certificate from the state superintendent should be allowed to teach. It would be well to have three classes of certificates to fit the needs of different schools. The school laws of New Hampshire are a farce and a jumble. Get the New Jersey school laws. They are the best in the United States. Massachusetts is way behind New Jersey in education and New Hampshire is at the tail end. We have seven schools in town and three would be better. But as we can only use 25 per cent. of the school money for transportation, we cannot unite them. Give 50 per cent. for transportation.”

“I would suggest that money for high school tuition be raised in school meeting in addition to the amount that the district may raise, in addition to the amount that the town must raise for support of schools. Also that the salaries of school boards, treasurers, clerks, should be paid by the town so that all money for school purposes may go for that purpose.”

“Any law that will compel the board of education to act more as a unit instead of so many separate individuals going as you please, or as you will, will tend to give all children more equal advantages and save funds.”

“If supervision is adopted, repeal the law allowing boards of education compensation for their services. This would, I think, tend to give us school officers actuated more by public spirit and an interest in educational work than by selfish motives as is now too often the case. Though the graft is small, there are plenty of small folks that want it and it creates ‘envy and all manner of uncharitableness.’ ”

“I believe we should have uniformity in our text-books. There should be a state committee to pass upon text-books in the different subjects, the books to be contracted for by state directly with publishers. Experience has taught me the ordinary member of school boards is incompetent to select text-books, and book agents often make the most of this. This method would make cheaper text-books, uniformity in preparation for higher work (as far as books are concerned), and relieve school boards of a duty of which they are incompetent.”

“Do not leave it optional to a town as to the number of weeks of school it should have, but make every town have forty weeks of school. In most of the towns around here we have but thirty-two weeks of school, which does not seem to me to be enough. Also have all schools in the state use a standard text-book chosen by a competent committee. About every town I know about, and even the different schools in this town, have several different text-books on the same subject, which makes it harder for a pupil changing from one school to another.”

“The whole thing is *rotten* and should be changed or returned to the old system. We had much better schools then than we have to-day, better teachers and more schooling at much less expense. I thoroughly believe now that the state has gone too far in meddling with town rights. It would be far better if they would take entire control of all public schools and pay all bills. Everything should be made direct charge of the state superintendent. You know very well the expense of running the schools and school privileges of pupils are very unequal over the state, and the more you try to equalize the farther you get from the object sought. Our schools are constantly growing poorer. No girl should be allowed to teach without a thorough course in normal school and a certificate from the state

superintendent. Excuse my long remarks, but I haven't said half of what I would like to."

"Possibly it is a matter that cannot very well be regulated by law, but it seems to me there ought to be a law to the effect that school boards shall organize as such within a reasonable time after each annual election and arrange to meet at stated times, not less frequently than once each month, so that routine business may be attended to without delay and so that any person having business with the board may know when and where they meet. Some school boards have no stated times for meeting and some meet subject to call of chairman, doing business in what might be termed a haphazard way."

"A stringent law should be passed making a contract with teachers as valid as any other contract, and a teacher should be subject to damages who breaks a contract during a school year, only in case of sickness or death. I hope to see such a bill become a law at the next session of the general court."

"I think all towns should be obliged to be under supervision for five years and then have it optional or allow them to withdraw by two-thirds vote of district."

"The truancy law should be remodeled on the basis of the Massachusetts and Wisconsin laws. The purpose of the law should be clearly defined. The law should be more elastic and the superintendent given power to grant excuses when he deems such excuses advisable. Two additional normal schools should be provided for, one in the southwestern and one in the southeastern part of the state. A law should be enacted making a teacher liable for damages in case of breach of contract."

"We find a disposition to send children to our ungraded schools when very young. Query: Whether or not the age should be a law? If our school laws were enforced to the letter, our schools would be better. Have not the ability to say how to amend present statutes."

## IMMEDIATE NEEDS.

The statute which established district supervision as the policy of the state, enacted in 1899, set apart \$6,250 annually, any unexpended part of which was to remain in the state treasury. Between 1899 and 1905, the adoptions were so slow as to allow about \$24,000 to accumulate in the treasury. Between 1905 and September, 1908, the accessions have been so numerous as to use up (1) the regular annual appropriation of \$6,250, plus (2) the accumulated surplus, plus (3) a large part of the sum of \$10,000 appropriated by the general court of 1907, for that year and the next,—leaving available under the existing law the annual appropriation of \$6,250, plus the net balance \$3,741.46, or \$9,991.46.

The state's half of the salaries of superintendents for the year just closed, was \$16,760.75. Hence, the balance on hand is but little more than half enough to carry the system through the current year, on the existing number of districts. During the year, new districts will undoubtedly be organized. Plainly then an immediate additional appropriation will be needed. The question is how much.

The expenditures for the last five years have been as follows:

Year.	Expenditure for supervision. State's half.	Increase over preceding year.
1904	\$4,959.00	
1905	8,685.00	\$3,726.00
1906	12,280.00	3,595.00
1907	15,457.49	3,177.49
1908	16,760.75	1,303.26

Average increase, \$2,950.44.

It is probable that the extension of the system will go on for the next two years at the average rate at least. This

would call for an expenditure for 1909 of	\$19,711.19
and for 1910 of	22,661.63
	<hr/>
or a total of	\$42,372.82
To meet this we have: two years' apportionment	
of \$6,250 each, or	\$12,500.00
plus net surplus of	3,741.46
	<hr/>
	\$16,241.46

Clearly then, in order to carry on the system for the next two years, we must have an appropriation of at least \$26,131.36.

There is, of course, a limit to the number of towns which can at any time come under the provisions of this law. A large number of towns are so placed financially that they cannot secure even approximately competent teachers, and it is idle to talk to such towns of the benefits of supervision. This class is provided for in the Vermont and Massachusetts statutes by the large proportion of the superintendent's salary paid by the state. Ultimately New Hampshire must make some similar provision. There are, however, approximately one hundred and fifty towns which can and doubtless will afford supervision under the existing law. This means that there are perhaps seventy-five more towns, or town districts, which can and ought to take advantage of the existing law. Doubtless some form of financial encouragement would greatly expedite their coming in, as in Vermont and Massachusetts.



## CHAPTER XIII.

## STATE SCHOOL MONEY.

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From the foundation of the government the principle has been recognized that the support of schools should be borne in part by the state and in part by the town. In obedience to this principle, most of the states either themselves set apart a portion of the public domain to provide a permanent basis of support for the common schools, or a similar portion was set apart for this purpose by the federal government before the statehood became an accomplished fact. New Hampshire's public lands were given almost entirely to private educational institutions.

Failing public lands to set apart, other states, as for instance Massachusetts, have sequestered allotments of the public taxes and provided for their accumulation into a school fund, the interest on such fund becoming afterward the permanent source of the state support of common schools. Not infrequently the existence of a school fund properly safeguarded from the chance of pernicious legislation, has attracted generous bequests which by their addition have greatly increased the amount of the fund as originally contemplated. Such was the case of the Huntington bequest now a part of the Vermont school fund. New Hampshire has never provided nor contemplated such a fund.

The following table shows the state support of schools, according to the latest report of the United States Bureau of Education, that for 1906. These figures do not represent the actual present state of the case, but they are near enough for comparative purposes. As a matter of fact, in many states, notably Maine, state support has been largely increased.



TABLE No. 50.

SHOWING STATE SUPPORT OF SCHOOLS.

STATE.	Income of permanent school funds and rent of school lands.	From state school taxes.	Total.
Maine .....	\$215,691	\$366,514	\$582,205
New Hampshire .....	<i>a</i>	65,012	65,012
Vermont .....	79,326	138,226	217,552
Massachusetts .....	<i>b</i>	390,863	390,863
Rhode Island (1904-5) .....	16,320	143,205	159,525
Connecticut .....	143,056	479,314	622,370
New York .....	<i>b</i>	4,616,769	4,616,769
New Jersey (1904-5) .....	200,000	3,013,591	3,213,591
Pennsylvania .....		5,500,000	5,500,000
Delaware (1904-5) .....		156,736	159,736
Maryland .....	<i>a</i>	1,062,501	1,062,501
Virginia (1904-5) .....	57,006	1,071,256	1,128,262
West Virginia (1904-5) .....	99,393	501,551	600,944
North Carolina .....		1,586,840	1,586,840
South Carolina .....		<i>f</i> 846,677	846,677
Georgia (1904-5) .....	<i>a</i>	1,591,441	1,591,441
Florida .....	<i>a</i>	238,756	238,756
Kentucky (1902-3) .....	<i>a</i>	1,695,575	1,695,575
Tennessee .....	430,524	600,000	1,030,524
Alabama (1904-5) .....	162,315	879,246	1,041,561
Mississippi (1902-3) .....	187,746	<i>f</i> 1,250,000	1,437,746
Louisiana (1904-5) .....	81,412	579,091	660,503
Texas .....	1,841,359	2,408,727	4,250,086
Arkansas .....	607,140		607,140
Oklahoma (1904-5) .....	236,875		236,875
Indian Territory (1904-5) .....			
Ohio .....	244,439	1,884,227	2,128,666
Indiana (1904-5) .....	682,480	1,831,654	2,514,134
Illinois .....	<i>a</i>	1,971,754	1,971,754
Michigan (1904-5) .....	2,328,776		2,328,776
Wisconsin .....	<i>b</i>	1,505,111	1,505,111
Minnesota .....	<i>b</i>	1,712,851	1,712,851
Iowa .....	881,349		881,349
Missouri .....	<i>b</i>	1,878,072	1,878,072
North Dakota .....	831,118		831,118
South Dakota .....	457,223	<i>a</i>	457,223
Nebraska .....	524,202	153,061	677,263
Kansas (1904-5) .....	435,226		435,226
Montana .....	205,361		205,361
Wyoming .....	115,327		115,327
Colorado .....	<i>a</i>	1,143,024	1,143,024
New Mexico (1904-5) .....	<i>c</i>	<i>d</i> 220,717	220,717
Arizona .....		41,006	41,006
Utah .....	38,079	391,941	430,020
Nevada .....	<i>a</i>	137,367	137,367
Idaho .....	<i>a</i>	165,259	165,259
Washington .....	300,000	1,630,263	1,930,263
Oregon (1904-5) .....	239,316		239,316
California .....	<i>a</i>	<i>e</i> 4,091,311	4,091,311

*a.* Not reported separately. *b.* Included in state taxes. *c.* Included, if any, in state taxes. *d.* Includes local taxes and income from permanent fund. *e.* Includes taxes on railroads and collateral inheritances. *f.* Includes poll tax.

The \$65,012 credited to New Hampshire, comprises the equalization and supervisory appropriations of \$25,000, the high school rebate of \$8,000, and the literary fund (for that year) of \$32,012.

#### THE EQUALIZATION FUND.

The equalization portion of the annual appropriation of \$25,000, amounts to \$18,750. This sum has been distributed the past two years as shown by the following table:

TABLE No. 51.

## DISTRIBUTION OF EQUALIZATION FUND FOR 1907.

TOWNS.	Equalized valuation.	Average attendance.	Equalized valuation per pupil of average attendance.	Paid by state for support of schools under law of 1899.
Stratford .....	\$573,070	316	\$1,814	\$1,087.53
Seabrook .....	326,643	175	1,867	585.17
Ellsworth .....	29,228	15	1,949	48.09
Orange .....	88,292	42	2,102	124.74
Stewartstown .....	473,942	202	2,346	536.54
Bartlett .....	515,208	218	2,363	575.91
Dalton .....	198,016	80	2,475	201.79
Dorchester .....	144,317	56	2,577	135.66
Clarksville .....	279,481	105	2,661	246.34
Conway .....	1,389,089	503	2,762	1,136.93
Eaton .....	150,044	54	2,779	121.31
Plaistow .....	395,210	141	2,803	317.61
Whitefield .....	920,802	322	2,860	702.87
Gorham .....	1,140,484	396	2,880	858.41
Columbia .....	335,636	116	2,893	250.32
Ossipee .....	847,305	286	2,963	505.85
Sullivan .....	173,133	57	3,037	117.17
Walpole .....	1,943,147	629	3,089	1,241.22
Groton .....	129,085	41	3,148	81.31
Milan .....	510,576	162	3,152	305.86
Northumberland .....	1,026,029	321	3,196	607.03
Troy .....	662,120	207	3,199	388.96
Springfield .....	234,827	72	3,261	137.83
Jefferson .....	508,908	154	3,305	282.90
New Durham .....	320,752	95	3,376	175.68
Effingham .....	267,357	79	3,384	145.45
Colebrook .....	1,194,955	352	3,395	641.63
Lyman .....	219,079	64	3,423	116.73
Haverhill .....	1,900,236	551	3,449	1,257.29
Stark .....	471,971	136	3,470	244.68
Unity .....	234,651	67	3,502	119.44
Chatham .....	151,751	42	3,613	72.52
Lempster .....	180,211	50	3,784	82.49
Madison .....	226,336	58	3,502	92.80
Orford .....	481,480	123	3,914	196.18
Danville .....	279,904	70	3,999	109.28
Tamworth .....	657,494	164	4,009	435.39
Fremont .....	356,410	88	4,050	135.65
Monroe .....	319,794	76	4,208	112.66
Greenfield .....	380,833	90	4,231	132.80
Sandown .....	183,026	43	4,256	63.07
Gilmanton .....	667,246	156	4,271	228.49
Fitzwilliam .....	638,801	148	4,316	205.07
Wilmot .....	320,907	74	4,337	106.52
Hampstead .....	465,474	106	4,391	140.70
Danbury .....	414,295	94	4,407	133.16
Wentworth .....	371,505	83	4,476	115.77
Piermont .....	379,851	84	4,522	115.96
Alexandria .....	329,000	72	4,569	98.37
Andover .....	838,806	182	4,609	231.52
Hebron .....	138,428	30	4,614	40.59
Warren .....	488,730	105	4,655	140.82
Richmond .....	351,094	75	4,681	100.02
Salem .....	1,159,710	244	4,753	306.28
Acworth .....	316,866	66	4,801	85.82
Hill .....	356,895	74	4,823	95.79
Wakefield .....	1,126,777	233	4,835	281.71

TABLE No. 51.—*Continued.*

TOWNS.	Equalized valuation.	Average attendance.	Equalized valuation per pupil of average attendance.	Paid by state for support of schools under law of 1899.
Lyndeborough.....	\$357,480	73	\$4,897	\$93.06
Deerfield.....	754,666	152	4,965	191.12
Barrington.....	679,614	136	4,997	159.91
Grafton.....	475,198	93	5,110	113.62
Freedom.....	269,331	51	5,281	60.29
Benton.....	186,227	35	5,321	41.06
Lyme.....	702,286	131	5,361	152.55
Easton.....	178,891	33	5,420	38.01
New Hampton.....	482,088	88	5,478	100.29
Campton.....	565,961	101	5,603	112.53
Bath.....	599,734	106	5,658	116.94
Northwood.....	717,580	122	5,882	127.78
Candia.....	711,866	119	5,982	124.19
Thornton.....	417,745	69	6,054	71.15

TABLE No. 52.

## DISTRIBUTION OF EQUALIZATION FUND FOR 1908.

TOWNS.	Equalized valuation.	Average attendance.	Equalized valuation per pupil of average attendance.	Paid by state for support of schools under law of 1899.
Seabrook .....	\$326,643	178	\$1,835	\$689.90
Stratford .....	573,070	300	1,910	1,116.47
Ellsworth .....	29,228	14	2,088	48.61
Orange .....	88,292	38	2,323	117.18
Eaton .....	150,044	62	2,420	182.95
Bartlett .....	515,208	187	2,755	483.04
Whitefield .....	920,802	334	2,757	861.36
Gorham .....	1,140,484	407	2,802	1,032.56
Plaistow .....	395,210	141	2,803	358.24
Dalton .....	198,016	70	2,829	176.72
Springfield .....	234,527	82	2,860	204.61
Dorchester .....	144,317	50	2,886	124.04
Stewartstown .....	473,942	164	2,889	404.14
Conway .....	1,389,089	456	3,046	1,064.16
Efingham .....	267,357	86	3,108	197.51
Troy .....	662,120	210	3,153	474.00
Sandown .....	183,026	58	3,156	131.51
Haverhill .....	1,900,236	577	3,293	1,248.41
Lempster .....	189,211	57	3,319	122.96
Walpole .....	1,943,147	571	3,403	1,192.62
Columbia .....	335,636	97	3,460	200.10
Lyman .....	219,079	57	3,492	116.92
Jefferson .....	508,908	139	3,661	270.37
Ossipee .....	847,305	231	3,668	448.24
Kingston .....	460,094	125	3,681	242.16
Sullivan .....	173,133	47	3,684	91.60
Groton .....	129,085	35	3,688	68.40
Ashland .....	908,476	245	3,708	470.24
Grafton .....	475,198	126	3,771	238.29
Madison .....	226,336	60	3,772	113.97
Northumberland .....	1,026,029	272	3,772	513.11
Unity .....	234,652	62	3,785	117.33
Danville .....	279,904	73	3,834	136.22
Warren .....	488,730	122	4,006	217.28
Middleton .....	145,103	36	4,030	64.44
Milan .....	510,576	126	4,052	221.84
Wentworth .....	371,505	88	4,222	149.04
New Durham .....	320,752	75	4,277	125.54
Woodstock .....	523,842	120	4,365	196.23
Fitzwilliam .....	638,801	140	4,563	218.90
Orford .....	481,480	105	4,585	163.64
Piermont .....	379,851	80	4,748	120.66
Wakefield .....	1,126,777	236	4,774	352.08
Bennington .....	380,152	79	4,812	117.59
Salem .....	1,159,710	241	4,812	356.68
Campton .....	565,961	117	4,837	172.78
Colebrook .....	1,194,955	241	4,958	346.15
Stark .....	471,971	95	4,968	136.80
Richmond .....	351,094	70	5,016	100.11
Fremont .....	356,410	71	5,019	101.46
Hill .....	356,895	71	5,027	101.31
Tamworth .....	657,494	129	5,097	180.00
Danbury .....	414,295	81	5,115	112.46
Acworth .....	316,866	56	5,658	70.29
Hampstead .....	465,474	82	5,676	102.60
Candia .....	711,866	125	5,695	155.87
Chatham .....	151,751	29	5,233	39.36

TABLE No. 52.—*Continued.*

TOWNS.	Equalized valuation.	Average attendance.	Equalized valuation per pupil of average attendance.	Paid by state for support of schools under law of 1899.
New Hampton .....	\$482,088	92	\$5,240	\$124.69
Bath .....	599,734	114	5,261	153.88
Northwood .....	717,580	135	5,315	180.38
Barnstead .....	756,766	141	5,367	186.58
Barrington .....	679,614	125	5,437	163.27
Rumney .....	575,209	105	5,478	136.12
Gilmanton .....	667,246	116	5,752	143.22
Lyme .....	702,286	122	5,756	150.52
Atkinson .....	333,800	57	5,856	69.12
Thornton .....	417,745	71	5,884	85.69
Dummer .....	262,201	44	5,959	52.44
Clarksville .....	279,481	46	6,076	53.65
Greenfield .....	380,833	61	6,243	69.39

Towns receiving a distributive proportion of the equalization fund fall into two classes,—first, those falling under \$3,000 of equalized valuation per pupil entitled by the terms of the statute, and second, those added by the governor and council upon recommendation of the superintendent of public instruction as needing relief from too great a burden of taxation.

Towns added under the second provision of the law have uniformly been those towns which on account of their peculiar conditions could not have even fairly good schools without a tax rate for school purposes exceeding the average for the state. Most such towns have had a tax rate greatly exceeding the normal rate.

No town has been added which was not known by the state superintendent to be in need of such money to enable it to maintain even passably good schools. No town, on the other hand, has knowingly been added in any year which had failed in the preceding year to devote its portion to the betterment of its schools. In each of the past four years several towns have been dropped from the list because it seemed evident that they had been tempted to relax their own efforts. In only one or two instances has such action failed to produce a vigorous effort the following year.

No town has been added upon the recommendation of the state superintendent, no matter how near the \$3,000 line it might have been, which could not show that it was itself making a vigorous effort for good schools and at the same time so situated as to make taxation a burden. *It has been assumed that the law was designed to improve rural schools and rural towns have been beneficiaries of the administration of the law.*

#### EFFECT OF THE EQUALIZATION APPROPRIATION.

The following table shows a comparative study between 1899 and 1908 of the towns which have received a distributive proportion of the appropriation every year.



TABLE No. 53.  
TOWNS WHICH HAVE RECEIVED EQUALIZATION FUND EVERY YEAR.

TOWNS.	Amount of dis- tribution.		Per capita avail- able.		School tax.		Average salary for women teachers.		Length of schools in weeks.	
	1892.	1908.	1890.	1908.	1899.	1908.	1899.	1908.	1899.	1908.
Dorchester.....	\$383.57	\$124.04	\$6.01	\$19.93	\$6.00	\$3.95	\$12.68	\$26.00	20.00	21.83
Seabrook.....	712.08	689.90	6.86	14.07	5.00	4.91	26.00	31.50	24.75	34.37
Chatham.....	175.49	39.36	11.15	27.14	7.40	4.35	10.00	28.00	22.00	24.00
Jefferson.....	703.21	270.37	8.10	23.00	5.00	9.68	28.00	28.44	21.00	28.50
Groton.....	229.69	68.40	9.05	20.09	7.30	4.07	19.00	24.12	19.00	26.05
Orange.....	127.88	117.18	9.34	7.91	5.10	3.56	18.83	26.25	16.50	20.00
Milan.....	488.38	221.84	9.25	19.52	5.00	5.06	27.20	33.73	21.25	31.50
Thornton.....	265.31	185.69	8.62	19.14	6.50	8.51	23.35	23.50	20.86	21.00
Madison.....	267.80	113.57	9.89	24.12	6.30	4.54	23.75	30.00	21.83	24.00
Columbia.....	306.54	200.10	9.09	18.91	7.00	6.41	20.00	27.00	21.31	29.10
Danville.....	240.37	136.22	10.32	16.10	5.50	4.37	30.00	35.33	30.25	30.00
Stark.....	317.57	136.80	8.19	15.10	4.00	3.72	24.37	22.90	24.62	30.50
Sullivan.....	180.58	91.60	11.10	19.90	7.50	4.00	25.20	28.50	22.22	20.25
Dalton.....	191.68	176.72	11.78	15.69	6.50	5.85	21.06	28.00	23.50	23.00
Springfield.....	159.01	204.61	10.81	11.37	6.10	3.52	20.00	28.00	23.17	23.00
Gorham.....	583.97	1,032.68	12.52	19.00	.....	6.42	31.75	31.00	33.00	31.21
Whitefield.....	853.90	861.36	.....	34.39	.....	3.65	.....	28.45	.....	30.18
Stratford.....	466.10	1,116.47	13.80	20.61	7.30	10.16	35.00	39.00	32.87	36.00
Effingham.....	203.63	197.51	10.77	19.89	6.60	9.96	25.80	42.00	27.40	36.00
Conway.....	825.85	1,064.16	10.72	15.85	4.60	3.68	24.00	28.00	20.14	26.17
Unity.....	192.86	117.33	10.31	16.76	5.40	6.11	30.00	35.50	33.57	33.22
Orford.....	319.06	163.64	10.17	18.47	2.50	3.23	20.22	23.44	21.00	24.16
Troy.....	374.94	163.64	12.52	30.16	6.60	6.69	28.00	32.00	29.15	32.85
Tamworth.....	282.97	474.00	11.12	19.33	9.60	4.82	29.43	37.00	26.66	35.50
Grafton.....	257.23	180.00	8.71	20.36	4.70	4.08	24.90	31.00	23.30	25.00
Lempster.....	114.39	238.29	8.15	14.04	2.90	3.68	24.00	28.25	20.10	24.40
Plaistow.....	188.06	122.96	14.87	19.17	6.10	3.47	20.00	25.66	20.00	20.00
.....	.....	358.24	13.37	16.16	3.00	3.84	30.66	33.50	29.50	36.83
Average.....	.....	.....	\$10.24	\$19.16	\$5.75	\$5.22	\$24.44	\$30.08	23.59	28.38

In 1899, these towns raised \$40,000.48; in 1908, \$46,739.26. It is therefore evident that the appropriation has not caused towns as a whole to relax their own efforts.

In 1899, the average tax rate of these towns was \$5.75 on one thousand dollars of valuation; in 1908 it was \$5.22. The average for the state in 1899 was \$4.30 and in 1908, \$5.58. Hence the law has served the purpose of bringing the tax rate for school purposes nearer to an equality.

The law has enabled these towns to increase the teacher's wage an average of \$5.64 per month. In some cases, the change is much more conspicuous than the average would indicate. For instance, note the change in Dorchester, Chatham and Stratford.

The law has enabled these towns to lengthen their school year an average of 4.79 weeks, but here again the average change fails to do justice to several individual towns, notably Seabrook, Milan, Columbia, Stratford and Troy.

In brief, this annual appropriation has enabled these towns to have longer school years and better teachers, without increasing an already heavy burden of taxation, and without encouraging them to relax their own efforts.

Other towns have from year to year shared in the appropriation with similar benefits to the schools situated therein. Follows a table showing all towns not mentioned in Table No. 53, which have at any time received a portion of the appropriation, together with the number of years in which such aid has been given.

TABLE No. 54.

## ADDITIONAL TOWNS ON EQUALIZATION LIST, 1889-1908.

Name of town.	Number of years in which aid has been apportioned.	Name of town.	Number of years in which aid has been apportioned.
Acworth,	6	Freedom,	5
Alexandria,	8	Fremont,	6
Andover,	5	Gilmanton,	6
Antrim,	4	Gilsum,	3
Ashland,	3	Goshen,	1
Atkinson,	1	Greenfield,	4
Barnstead,	1	Hampstead,	5
Barrington,	4	Haverhill,	3
Bartlett,	9	Hebron,	4
Bath,	2	Hill,	5
Bennington,	8	Holderness,	5
Benton,	5	Jackson,	3
Bethlehem,	3	Kingston,	8
Bridgewater,	5	Lyman,	8
Campton,	7	Lyme,	5
Candia,	3	Lyndeborough,	2
Carroll,	4	Middleton,	8
Clarksville,	8	Monroe,	5
Colebrook,	8	Moultonborough,	7
Cornish,	2	New Durham,	8
Croydon,	1	New Hampton,	8
Danbury,	8	Newmarket,	1
Deerfield,	4	Northfield,	2
Deering,	2	Northumberland,	9
Dummer,	8	Northwood,	2
Easton,	1	Ossipee,	9
Eaton,	9	Piermont,	9
Ellsworth,	9	Pittsburg,	3
Errol,	2	Randolph,	4
Fitzwilliam,	9	Raymond,	4

Name of town.	Number of years in which aid has been apportioned.	Name of town.	Number of years in which aid has been apportioned.
Richmond,	7	Swanzy,	1
Rumney,	2	Tuftonborough,	3
Salem,	9	Wakefield,	3
Sanbornton,	1	Walpole,	4
Sandown,	7	Warren,	6
Sharon,	4	Washington,	1
Shelburne,	2	Wentworth,	8
Stewartstown,	9	Wilmot,	1
Stoddard,	2	Windsor,	3
Sutton,	1	Woodstock,	9

*Defects in the law.* The law is based upon right principles in that the amount of money which a town receives is exactly proportioned to its need so far as the returns of the board of equalization show its need—the poorer the town the more it receives.

On the other hand, the computation required is complicated and probably beyond most town officers. The statute could be simplified without serious detriment to its main purpose so that any town officer might know the sum to which his town would be entitled.

The change of conditions since 1899 has left only a small portion of the towns under the statutory \$3,000 line. Others must be added by the governor and council upon recommendation of the state superintendent. This practically lodges large discretionary power in the hands of the superintendent, more probably than is wise. The statute might be improved in the direction of definiteness, so that the state superintendent might know more exactly what he ought to do, and so that interested people might be able to understand rightly his action in the premises. Discretionary power involves the element of individual judgment, and in purely governmental affairs in-

dividual judgment should be kept within as narrow limits as possible.

The amount provided for under the statute is inadequate. It will be seen from Table No. 53 that while it has in a measure accomplished its purpose it has done so only in part. In the case of the towns having the lowest valuations, it has enabled them to lengthen their school years in part but they are still for the most part obliged to stop short of thirty weeks and to employ but indifferent teachers. Those towns which have done more have usually done so at the cost of a high rate of taxation, a rate which the voters are not likely permanently to bear with equanimity.

On the other hand, there are in the state nearly as many towns which do not receive state money and need it, as towns which now receive it. The appropriation should be made large enough at once to enable all towns in the state to maintain their schools at a minimum of thirty weeks in the year and to employ only teachers who are at least graduates of high schools and academies.

The statute should be further changed so as to guarantee that all towns receiving an apportionment shall use the same to the betterment of their schools and not to the relief of their treasuries. The history of the law shows that few towns have shown any disposition to take an unfair advantage, but some towns have done so and such cases should be foreseen by the statute.

#### THE LITERARY FUND.

The literary fund, so called, is the tax assessed upon the deposits, stock and attending accumulations of those depositors and stockholders of savings banks, trust companies, loan and trust companies and similar corporations, who do not reside in this state or whose residence is unknown. It amounts to between \$30,000 and \$40,000 annually, varying somewhat from year to year. The dis-

tribution to the different towns and cities will be found in the appendix in the table devoted to revenue.

It will be noted from a reading of the statute that this income is distributed in direct proportion to the number of children five years of age and upward who have attended not less than two weeks during the year. This method of distribution is antiquated and ineffective; its outcome is that this very considerable sum is so scattered as to produce little, if any, effect upon the schools.

1. It goes to rich towns and poor towns alike without reference to their needs. The cities take about two-fifths of the entire sum. With their large local appropriations, the effect of even this large fraction of the literary fund is lost; it does good undoubtedly, but such good is relatively little. Much the same is true of the richer towns. If the amount now given to the eleven cities were given to the seventy poorest towns, it would nearly double the effect of the equalization fund. In brief, distributed as it now is, this money does little good to anybody; if it were added to the equalization fund, and distributed as that is to the poorer towns, it would do a great deal of good.

2. It is distributed on the basis of two weeks' attendance. This puts no premium on securing regular and prolonged attendance as does the equalization fund; on the contrary, it puts a premium on getting children to school for two weeks and then getting them out. It should be distributed on the basis of average attendance, multiplied by number of weeks, which would put a premium both on securing regular attendance and on lengthening the school year.

#### HIGH SCHOOL REBATE.

Under the law of 1901, every town not maintaining a high school, or equivalent institution, is liable for the tuition of pupils who with parents or guardians reside within its limits and attend such an institution in another town.



In certain cases a portion of the tuition thus paid by the town is rebated by the state, depending upon the rate of taxation in the town.

No rebate is paid by the state unless the rate of assessment for school purposes in the town is at least \$3.50 on \$1,000 valuation.

In case such a rate of school assessment is maintained and the tax rate for all purposes is between \$16.50 and \$17.49, then one-tenth of the amount paid for tuition by the town is rebated by the state.

In case the general rate of tax is between \$17.50 and \$18.49, two-tenths; between \$18.50 and \$19.49, three-tenths; and so on until the state rebates the entire amount paid for tuition in those towns having a general tax rate between \$25.49 and \$26.50.

Few school laws, if any, ever placed upon the statute book have been productive of such immediate results as this. It has made high school and collegiate education possible to many thousands of boys and girls who could otherwise never have cherished any ambitions reaching beyond the common schools. It has been a very effective part of the equalization policy of the state. It has reacted upon the high schools so as enormously to improve them in efficiency to such an extent that there is probably no state system of high schools in the country to-day better equipped to do efficient work than those of this state.

The amount of money required from the state treasury under this rebating policy has steadily increased with the increasing attendance at high schools and academies. Recalling that the average rate of increase in the size of such institutions has been 10.7 per cent. annually, it is easily to be understood why increasing calls on the state for rebates have been made. In 1905, it was found that the total amount called for exceeded the appropriation of \$5,000, and this appropriation was increased to \$8,000. The call for rebates exceeded the new appropriation of



\$8,000 that very year, and has now reached \$12,000. The following summary shows the amount called for each year since 1902:

Year.	Total amount of rebate called for under the law by town expenditure.	Appropriation.
1902	\$4,086.87	\$5,000
1903	6,038.36	5,000
1904	7,918.03	5,000
1905	10,207.54	8,000
1906	9,960.22	8,000
1907	11,622.87	8,000
1908	12,851.12	8,000

It will thus be seen that an increased appropriation for this purpose is needed if the state is to keep faith with the towns. At the average rate of increase during the last five years, we shall apparently need the following sums for the ensuing five years:

For 1909,	\$14,193.65
For 1910,	15,536.18
For 1911,	16,878.71
For 1912,	18,221.24
For 1913,	19,563.81

Attention is called to the fact that the appropriation of Vermont for this item is \$15,408.32, and that of Massachusetts, \$56,613.94.

#### NEED OF SOME REGULAR SOURCE OF INCOME FOR STATE PUBLIC SCHOOL EXPENDITURES.

Summarizing the statements of this and other chapters, it appears that the present policy of the state contemplates a gradual extension of the supervisory system as rapidly as local option approves. I have pointed out in Chapter XII that in order to carry on the supervisory system for the

next two years, we must have an additional appropriation of \$26,131.36. The amount needed to pay the state's half of the superintendent's salary will gradually increase until the state is entirely under supervision.

The state is committed to the policy of rebating certain sums of money to the towns in payment of high school tuition. As advantage has more and more been taken of the law, larger sums have been called for until we now need an increase of \$7,000 annually for the next two years. This amount will also continue to increase somewhat, but probably more and more slowly unless a large increase in population should come to the state.

The state is committed to the policy of adjusting the differences in the ability of towns to raise money for the support of schools by distributing an equalization fund. There is a manifest need and a strong call for an increase in this fund. Other states are appropriating for this purpose more than we are.

This being the situation, it seems to the state superintendent that wise and orderly procedure requires some permanent source of revenue sufficient to provide for all these various needs, and such that any portion unexpended in any year could be devoted to the gradual accumulation of a permanent invested school fund. If revenue aggregating \$125,000 could be set aside and devoted to the school purposes of the state, it would be sufficient to provide for all the needs which I have enumerated for several years to come. With a revenue of this amount, I should suppose that it would be wise to devote as much as might be needed for any year to supervision and high school rebate, and the distribution of the remainder to the towns. This would automatically care for these three important interests until the amount remaining for distribution to the poorer towns should become too small.

If revenue amounting to \$200,000 could be set aside, it would be sufficient to provide for the carrying out of the

entire policy of supervision, for the rebating of all high school tuitions likely to be due under the high school law within the next twenty-five years, and to carry out very largely the solution of the whole question of the equalization of school privileges. It would be some years before the requirements for payments under the supervisory and high school laws would reach their maximum and, meantime, such a revenue would yield ample returns for the erection and present maintenance of such new normal school equipment as we need.

In other words, some source of revenue which would yield the state \$200,000 for its public school purposes would provide a fiscal basis for the established policy of the state for the next twenty-five years. The opportunity for the free and natural and unhampered development of our public schools which such a revenue would make possible, is certainly one which ought not lightly to be passed over. It is perhaps unnecessary to refer to the fact that even this revenue would be considerably less than the present state school revenue of any other New England state. Our nearest and most comparable neighbor, Vermont, according to the most recent enactment, has available about \$270,000 a year, exclusive of normal school building and support appropriations. I venture the assertion, however, that the existing method of distributing our very small present state school revenue, if applied on a large scale, would make \$200,000 as effective in New Hampshire in the direction of better schools, as much larger sums are in the other New England states.

## CHAPTER XIV.

## LOCAL SCHOOL MONEY.

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The local school revenue under the existing law may come from any one or all of the following sources:

- I. Money required by law. Chapter 88, section 1.
- II. Additional raised by the town. Chapter 88, section 2; chapter 40, section 4.
- III. Additional raised by the district. Chapter 88, section 8.
- IV. Literary fund. Chapter 88, sections 9-13.
- V. Dog tax. Chapter 88, section 14.
- VI. In some cases, equalization apportionment. Chapter 77, section 6, Laws of 1899.
- VII. In some cases, supervisory apportionment. Chapter 77, section 6, Laws of 1899.
- VIII. In some cases, rebate for payment of high school tuition. Chapter 96, Laws of 1901.

The expenditure of this school money, so called, is narrowly and rigorously prescribed by the statutes. The statutory prescriptions are followed with varying degrees of precision. Generally speaking, they are closely followed in the towns and laxly followed in the cities. Certain items of expenditure are made obligatory upon the town and cannot lawfully be paid out of the school money. This applies notably to high school tuition, the purchase of textbooks and supplies, payment for flag, flag-staff and appurtenances. It is understood that payment for none of the items just named can be made out of school money, but that on the contrary they are all in the nature of obligations which the school board is compelled to incur and the selectmen compelled to pay.

Our methods of raising and expending school money have grown up piecemeal and have many of the faults of the process. The result is great uncertainty on the part of local school officers and the local town officers. The school board is apt to be justifiably uncertain as to what payments to authorize. This is notably true in the case of high school tuition. Boards of selectmen are constantly embarrassed by the presentation of bills which they had no cause for anticipating and for the payment of which they often have no funds in their hands. The practical net outcome is, of course, a great deal of confusion and delay which can usually be translated into terms of actual money loss.

I think there is general agreement amongst all school officers who have been familiar with the situation, that the existing methods of raising money in part by the town meeting and in part by the district meeting, or by either as the case may be, is unfortunate in that it is productive of misunderstandings and probably productive in some cases of a disposition to political manipulation, which is mischievous.

In order to establish the principle of universal common school education, some such statute as chapter 88, section 1, was necessary. Since that statute was enacted in colonial times, the amount required to be raised has been changed many, many times, but the method is exactly the same, even to the wording of the statute, as it has been for a period of more than one hundred years. The statute is practically meaningless, since practically every town in the state raises more than the amount required by law, and the exceptions to this general rule are chiefly those towns in which the amount required by law gives them as much as they think necessary for school purposes. The only benefit of the statute is that it affords a means of preventing school appropriations from slipping back. As local public opinion has more and more justified larger expenditures



for public schools, the legislature has from time to time increased the amount required by law, and thus the schools have been saved from the possibility of greatly reduced funds in any year. I believe, however, that under existing conditions, the general purpose of the law would be much better served if, instead of basing the required amount of money upon the state taxes paid by the town, it should be based rather upon a certain minimum length and excellence of schools. For instance, whereas at present the selectmen are required to assess upon the polls and ratable estate taxable in each town a sum of money equal to \$750 for every dollar of the public taxes apportioned to such town, results would be better, more definite, more uniform, much better understood, and withal more just if the selectmen were required to assess upon the polls and ratable estate taxable in each town a sum sufficient to maintain the public schools therein, conveniently located and with competent teachers, not less than thirty weeks in the year.

The selectmen should also be required definitely to assess upon the polls and ratable estate taxable in each town a sum sufficient to pay all legal claims against the town for high school tuition, for text-books and supplies.

The selectmen should also be definitely required to assess upon the polls and ratable estate taxable therein, a sum sufficient to provide each school with flag, flag-staff and appurtenances, and to satisfy all other statutory obligations for the support of schools. These matters must, of course, of necessity be independent of any action upon the part of the town meeting or district meeting.

All additional sums appropriated for the support of schools, for election, remodeling and maintenance of buildings, for the payment of school boards, truant officers and enumerators, in fact for all school expenses, should be raised exclusively in the district meeting and not in the town meeting. In short, where the distinction is drawn

between the town and school district, the division should be carried out to its logical extremity, that is, a complete separation.



### PART III.

## RECOMMENDATIONS OF THE SUPERINTENDENT.

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“He shall biennially make a report containing a statement of the condition and progress of popular education in the state, and such suggestions and recommendations in regard to improving the same as his information and judgment may dictate.”

In obedience to the law, I submit the recommendations which follow. In nearly every case the ground of the recommendation has been fully discussed either in my account of the doings of the superintendent or in my treatment of the conditions and progress of popular education. The recommendations are made in accordance with what seems to me their logical order of need. The first two, however, are vitally bound up together. The towns which most need better teachers cannot have them unless there is money with which to pay for them. On the other hand, whatever the money, you cannot have teachers unless there is a supply.

I recommend then :

I. That the present annual appropriation for the equalization of school privileges be largely increased, that conditions be attached insuring the use of all state apportionments for betterment, especially in the direction of teachers' salaries and in length of term; that the minimum school year be fixed at thirty weeks; and that the present statute be so modified as to remove the complications at

present involved in its administration and to increase its definiteness.

II. That the legislature authorize the immediate erection of at least two new normal schools, contemplating that further schools will, from time to time, be established until the state has created a supply of trained teachers equal to the demand.

III. That the appropriations for high school rebate and for district supervision be increased so as to allow for the normal extension of the state's policy in these directions. In connection with this recommendation, I further recommend that some regular source of revenue be found and set apart as a State Public School Revenue sufficient in amount to guarantee the development of the state's established policy with reference to the equalization of school privileges, district supervision and high school tuition to the logical completion thereof.

IV. That chapter 88 of the Public Statutes and amendments thereto and all other statutes relating to the raising and expenditure of local school moneys be rewritten and condensed so as: (1) to eliminate all conflicts between the different statutes; (2) to specify definitely the duties of the selectmen in making assessment of school taxes; (3) to draw the line more definitely between the powers of the town and the powers of the district in such a way that the raising and appropriating of all school moneys will rest with the district meeting.

V. That the general court provide for the establishment and maintenance of an inspecting force sufficient annually to inspect every school district in the state and every approved academy; investigating all important matters in connection therewith ranging from the method of raising, appropriating and expending school moneys to the scholastic efficiency of the various local systems as wholes; reporting the same to the department of public instruction and to the clerk of each school district or academy.

VI. That the general court provide some adequate method of appeal to some suitable county or state officer from the decision of local school boards, especially in matters relating to the transportation of school children.

VII. That laws be enacted providing that no new school-house shall hereafter be erected except upon plans approved either by the superintendent of public instruction or by the state board of health as being in conformity to recognized laws of hygiene, and furthermore that the appropriate officer be authorized and directed to investigate school-house conditions, either upon petition or otherwise, and condemn unclean or otherwise unfit buildings.



# APPENDICES.



APPENDIX A.  
STATISTICAL TABLES.  
1907.





## TABLE No. I.—BELKNAP COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Alton .....	10	9	3	2	36	20	30.31
Barnstead .....	12	.....	3	3	28	21	23.66
Belmont .....	11	5	1	2	34	*12	30.90
Center Harbor .....	5	2	3	.....	29	22	25.52
Gilford .....	8	.....	1	.....	27	23	25.00
Gilmanton .....	12	.....	6	2	29	29	29.00
Laconia .....	28	26	.....	.....	36	36	36.00
Meredith, town district .....	7	.....	5	.....	35	26	30.43
Meredith, special district .....	3	3	.....	.....	33	33	33.00
New Hampton .....	8	.....	4	.....	32	22	30.00
Sanbornton .....	9	.....	3	.....	33	27	28.44
Tilton, town district .....	4	.....	1	.....	34	32	33.00
Tilton, Union district .....	8	8	.....	.....	36	36	36.00
Total .....	125	53	30	9	.....	.....	30.75

\* Scholars conveyed.

TABLE No. II.—BELKNAP COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Alton .....	10	.....	.....	13	\$9,000.00	\$600.00
Barnstead .....	13	.....	.....	13	6,500.00	500.00
Belmont .....	7	.....	.....	11	9,500.00	110.00
Center Harbor .....	4	.....	.....	5	2,350.00	50.00
Gilford .....	10	2	.....	10	4,200.00	100.00
Gilmanton .....	17	1	.....	17	4,700.00	200.00
Laconia .....	10	.....	.....	33	130,000.00	3,000.00
Meredith, town district .....	12	.....	.....	12	3,900.00	300.00
Meredith, special district .....	1	.....	.....	4	10,000.00	200.00
New Hampton .....	12	.....	.....	12	5,000.00	200.00
Sanbornton .....	13	.....	.....	13	6,700.00	310.00
Tilton, town district .....	4	.....	1	4	5,000.00	150.00
Tilton, Union district .....	1	.....	.....	8	2,500.00	500.00
Total .....	114	3	1	155	\$199,350.00	\$6,220.00

TABLE No. III.—BELKNAP COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school; tuition paid by town.	Pupils attending academy; tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Alton .....	111	97	92	101	...	179	14	1	...	...	178	165	93	1	...
Barnstead .....	69	77	76	91	3	164	...	...	10	...	132	117	89	...	...
Belmont .....	115	130	130	141	3	262	6	...	3	5	212	190	89	2	...
Center Harbor ...	47	42	49	39	...	87	1	...	2	...	67	56	84	...	...
Gilford .....	57	66	61	54	6	103	6	...	11	...	86	79	92	1	...
Gilmanton .....	99	93	88	93	1	177	3	...	...	13	181	156	86	...	...
Laconia .....	786	780	715	734	2	1,336	111	19	...	...	1,035	1,003	96	450	...
Meredith, town ...	70	47	67	53	1	119	...	...	5	15	74	66	89	...	...
Meredith, special.	52	71	71	84	...	149	6	5	...	4	102	93	91	...	...
New Hampton ...	62	51	82	63	5	136	4	...	4	24	99	88	89	...	...
Sanbornton .....	97	70	75	72	...	142	5	...	5	12	118	102	86	...	...
Tilton, town .....	61	58	56	58	1	113	...	...	...	12	79	68	86	...	...
Tilton, Union ....	156	140	176	163	...	331	8	...	...	27	278	269	93	2	...
Total .....	1,601	1,578	1,738	1,746	22	3,298	164	25	40	112	2,641	2,443	93	456	...

\* Between five and sixteen inclusive.

TABLE No. IV.—BELKNAP COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Alton .....			14	\$32.00	4	1	3		3
Barnstead .....	1	\$30.00	12	29.72			1	2	
Belmont .....	1	64.00	13	35.24	1	6	2	1	1
Center Harbor .....			5	31.60	1		1	1	
Gilford .....			11	26.68	3		2		
Gilmanton .....	1	26.00	20	22.50	2	4	1		
Laconia .....			28	41.96	1	9	14		1
Meredith, town .....	2	28.00	5	28.00	1	2			
Meredith, special .....			3	28.32			2		
New Hampton .....	2	28.00	11	26.50	2	4			
Sanbornton .....	1	24.00	11	24.00	2	1	1		1
Tilton, town .....			6	36.43	2	1	1		
Tilton, Union .....	1	93.34	7	40.00	1		5		
Total .....	9	\$39.93	146	\$31.63	20	28	33	4	6

TABLE No. V.—BELKNAP COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.]	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Alton .....	\$2,032.50	\$2,350.00		\$127.49			\$300.00	\$297.65	\$51.50	\$5,159.14
Barnstead.....	1,815.00	200.00	\$150.00	111.02	\$138.19	\$108.40		201.52	8.57	2,732.70
Belmont .....	1,875.00	1,200.00		171.41		\$2.88		189.00	8.00	3,526.29
Center Harbor...	930.00	200.00		58.56				92.20	20.35	1,301.11
Gilford .....	1,335.00	550.00	111.23	74.42	33.60	27.49		68.96		2,200.70
Gilmanton .....	1,597.00	300.00	133.00	125.05			182.00	101.80	25.00	2,463.85
Laconia .....	15,397.50	9,102.00		791.17					800.27	26,090.94
Meredith, town..	1,536.85	270.00		93.54	50.00					1,950.39
Meredith, spec..	1,290.65	1,226.82		79.70					90.60	2,687.77
New Hampton...	1,117.50	200.00		92.11			95.70	131.20	24.00	1,669.51
Sanbornton .....	1,552.50	225.00		117.73	77.71	96.49		164.75	23.25	2,237.43
Tilton, town.....	1,669.97	825.00		80.95	37.26	*789.59	150.00	101.34		3,654.11
Tilton, Union....	2,417.53	1,775.00	500.00	202.70				235.75	100.00	5,230.98
Total.....	\$34,567.00	\$18,423.82	\$894.23	\$2,125.85	\$336.76	\$1,104.85	\$727.70	\$1,584.17	\$1,151.54	\$60,915.92

\* Both districts.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Alton .....	\$153.32	\$37.25	\$59.74	\$3,453.34	\$600.00	.....	\$70.00	\$2.25	\$53.50
Barnstead .....	112.95	1.50	14.22	2,092.50	.....	\$299.21	125.00	20.00	131.10
Belmont .....	171.83	.....	70.21	3,010.50	.....	239.66	111.45	33.95	57.00
Center Harbor.....	68.53	.....	42.06	972.90	.....	76.00	35.00	3.00	70.00
Gilford .....	82.42	.....	28.81	1,265.60	.....	300.83	75.00	10.00	64.40
Gilmanton.....	133.00	18.00	.....	1,942.50	.....	349.00	90.00	.....	183.30
Laconia .....	657.32	102.63	784.25	17,255.20	1,300.00	.....	90.00	360.00	666.75
Meredith, town ..	24.74	.....	26.25	1,541.40	.....	443.67	120.00	.....	159.75
Meredith, spec. ..	155.00	75.00	75.00	1,873.15	.....	195.00	60.00	10.00	.....
New Hampton.....	25.00	.....	15.00	2,036.00	.....	807.70	90.00	10.00	95.00
Sanbornton.....	62.20	.....	14.08	1,620.00	.....	633.65	115.00	.....	35.00
Tilton, town.....	120.78	.....	51.71	1,245.20	300.00	426.66	80.00	3.00	.....
Tilton, Union .....	324.37	15.00	135.63	3,501.12	.....	1,960.00	.....	10.00	.....
Total .....	\$2,091.46	\$249.38	\$1,316.96	\$41,809.41	\$2,200.00	\$5,731.38	\$1,061.45	\$462.20	\$1,515.80



## BELKNAP COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$10.15		\$132.40	\$258.69	\$142.85	\$4,963.34				\$4,963.34	\$6.58	\$27.94
5.40		81.00	83.00	104.56	2,994.19			\$62.09	3,056.28	4.25	21.08
58.72		13.79	48.60	22.63	1,352.51			22.88	1,375.39	4.06	20.19
40.56			49.85	18.48	1,954.11		\$300.00		2,254.11	4.38	20.15
503.21	\$220.22	1,203.50	94.77	17.50	2,868.63			95.41	2,964.04	3.87	14.78
			2,070.85	82.02	25,295.95				25,295.95	5.18	24.44
			65.60	49.11	2,430.52			450.00	2,880.52	3.66	25.85
44.28	37.50	140.00	144.82	166.76	2,976.51	\$480.94			3,457.45	6.12	29.18
			41.00	27.75	3,147.45			62.82	3,210.27	3.81	24.98
			85.00	60.70	2,625.63			102.61	2,728.24	4.18	19.45
42.28	36.20	30.70	74.75	81.83	2,493.11	1,086.26	141.65		3,721.02	6.69	27.39
181.11	225.00	352.80	393.09	283.30	7,381.42	1,000.00	400.00	322.58	9,104.00	6.66	24.20
\$835.71	\$518.92	\$1,954.19	\$3,604.32	\$1,075.93	\$64,477.11	\$2,567.20	\$841.65	\$1,178.39	\$69,064.35	\$5.03	\$23.09

\*On one thousand dollars of inventoried valuation.



TABLE No. I.—CARROLL COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Albany .....	4	.....	1	.....	26	*17	20.85
Bartlett, town district.....	6	.....	3	.....	30	20	28.33
Bartlett, special district.....	4	4	.....	.....	33	33	33.00
Brookfield.....	3	.....	3	2	27	25	26.33
Chatham.....	4	.....	2	1	26	20	23.50
Conway.....	19	13	.....	.....	34	32	33.31
Eaton.....	6	.....	5	.....	32	*11	25.00
Effingham.....	7	.....	1	1	29	25	27.42
Freedom.....	4	.....	2	1	31	29	30.50
Hart's Location † .....	.....	.....	.....	.....	.....	.....	.....
Jackson, town district .....	5	.....	3	2	30	24	27.40
Jackson, special district .....	2	1	.....	.....	30	30	30.00
Madison.....	5	.....	.....	1	24	23	23.60
Moultonborough.....	8	.....	3	.....	27	27	27.00
Ossipee.....	11	.....	2	1	34	34	34.00
Sandwich.....	7	.....	1	1	30	*16	28.00
Tamworth.....	11	.....	2	3	26	*10	25.00
Tuftonborough .....	5	.....	3	.....	30	30	30.00
Wakefield .....	14	9	3	2	35	32	33.00
Wolfeboro .....	14	14	3	3	36	34	35.80
Total.....	139	41	37	18	.....	.....	29.25

\*Scholars conveyed.

† No school maintained during year. One child sent to Bartlett.

TABLE No. II.—CARROLL COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Albany .....	4	.....	.....	4	\$3,000.00	\$500.00
Bartlett, town district...	6	.....	.....	6	3,500.00	500.00
Bartlett, special district.	1	.....	.....	4	5,800.00	150.00
Brookfield .....	3	.....	.....	3	1,600.00	75.00
Chatham .....	5	.....	.....	5	2,700.00	60.00
Conway .....	15	.....	.....	23	20,000.00	260.00
Eaton .....	7	.....	.....	7	5,000.00	100.00
Effingham .....	7	.....	.....	7	4,000.00	200.00
Freedom .....	5	.....	.....	6	3,000.00	100.00
Hart's Location .....	.....	.....	.....	.....	.....	.....
Jackson, town district...	5	.....	.....	5	3,600.00	30.00
Jackson, special district.	1	.....	.....	2	1,800.00	100.00
Madison .....	6	.....	.....	6	2,000.00	500.00
Moultonborough .....	8	.....	.....	8	3,500.00	50.00
Ossipee .....	12	.....	.....	12	11,000.00	600.00
Sandwich .....	8	.....	.....	9	3,500.00	100.00
Tamworth .....	13	.....	.....	13	4,000.00	300.00
Tuftonborough .....	5	.....	.....	5	5,000.00	100.00
Wakefield .....	12	.....	1	15	13,000.00	500.00
Wolfeboro .....	10	.....	.....	15	20,000.00	500.00
Total .....	133	.....	1	155	\$116,000.00	\$4,665.00

TABLE No. III.—CARROLL COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Percent of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Albany .....	19	15	31	19	4	45	1	...	...	...	38	34	89	...	...
Bartlett, town ..	73	49	74	50	...	124	...	...	...	...	124	99	80	...	...
Bartlett, special..	60	82	67	79	...	143	3	...	1	...	129	119	92	4	...
Brookfield .....	22	21	28	28	...	55	1	...	...	...	40	34	85	...	1
Chatham .....	10	26	15	28	...	42	1	...	...	...	43	42	97	...	...
Conway .....	274	251	305	281	10	558	18	...	2	2	561	503	89	1	2
Eaton .....	41	34	36	40	2	72	2	...	...	...	71	54	77	...	...
Effingham .....	65	37	70	34	1	102	1	...	...	3	94	79	84	...	2
Freedom .....	36	34	43	32	2	67	6	...	...	...	61	51	83	...	5
Hart's Location..	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jackson, town ..	21	25	23	26	2	46	1	...	1	...	45	39	87	...	...
Jackson, special ..	21	34	30	41	...	71	...	...	1	...	50	47	94	...	...
Madison .....	61	44	44	42	...	83	3	...	2	...	67	58	86	...	12
Moultonborough..	69	59	82	70	2	148	2	...	...	...	146	134	91	...	...
Ossipee .....	158	142	181	143	12	298	14	...	6	...	306	286	93	...	...
Sandwich .....	53	49	56	58	4	104	6	...	2	10	97	84	86	...	...
Tamworth .....	87	87	90	93	1	175	7	...	...	...	180	164	91	1	6
Tuftonborough ..	42	39	52	35	1	86	...	...	...	...	70	61	87	...	...
Wakefield .....	175	114	184	137	2	314	5	...	22	...	264	233	88	...	...
Wolfeboro .....	149	143	146	128	...	273	1	...	...	...	239	214	89	...	...
Total .....	1,364	1,236	1,557	1,364	43	2,806	72	...	37	15	2,625	2,335	89	6	28

\* Between five and sixteen inclusive.

TABLE No. IV.—CARROLL COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Albany.....			5	\$28.00	1	3			
Bartlett, town.....			6	18.00	1		1		
Bartlett, special.....	1	\$52.00	4	35.50			3	2	
Brookfield.....			5	29.12	2	3			
Chatham.....			4	28.00		1	1		
Conway.....	1	52.00	26	35.00	1	2	7	4	1
Eaton.....	3	26.00	8	26.00	3	3			1
Effingham.....	3	28.00	8	28.00		4	1		2
Freedom.....	1	40.00	5	22.00	1	3			
Hart's Location.....									
Jackson, town.....			8	24.80	5	1			
Jackson, special.....			2	38.00					
Madison.....	3	35.00	2	28.00		3		2	
Moultonborough.....			8	28.00	1	7	1		
Ossipee.....	2	40.00	9	32.00	2	6	1	1	
Sandwich.....	1	32.00	7	28.00		3	1	1	
Tamworth.....	1	32.00	10	30.00	3	4			
Tuftonborough.....			6	34.00		1	1	1	
Wakefield.....	1	60.00	15	32.00	6	1	6	2	1
Wolfeboro.....	2	54.00	17	34.00	3	4	3	2	
Total.....	19	\$38.05	155	\$30.32	29	49	26	15	5

TABLE No. V.—CARROLL COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Albany.....	\$277.50	\$300.00	\$50.00	\$31.11			\$51.60	\$39.60	\$44.90	\$744.71
Bartlett, town..	565.85	400.00	50.00	103.22			395.32	170.07		1,684.46
Bartlett, special.	491.65	650.00	50.00	68.80			263.55	68.00	9.80	1,601.80
Brookfield.....	397.50	100.00	60.00	28.06			39.60	25.40		650.56
Chatham.....	322.50	277.50	50.00	25.62			53.26	27.30	27.00	783.18
Conway.....	3,157.50	3,000.00		345.87	\$9.40	\$6.53	966.65	302.68	19.00	7,807.63
Eaton.....	339.00	460.00	125.00	42.70			120.49	40.20	80.95	1,199.34
Effingham.....	637.50	300.00	100.00	71.98	7.50	24.56	194.60	84.80	29.00	1,449.94
Freedom.....	667.50	250.00		49.41			76.39	82.00		1,125.30
Hart's Location.	82.50			2.44						84.94
Jackson, town..	548.44			28.21	18.00			135.02		729.67
Jackson, special.	329.06	250.00		39.50	8.50			29.21	85.00	741.27
Madison.....	570.00	600.00	100.00	61.61			219.04	99.90	17.62	1,668.17
Moultonborough	1,185.00	315.00		95.77				115.00		1,710.77
Ossipee.....	1,747.50	1,150.00	250.00	175.68		2.50	570.14	53.47	17.00	3,966.29
Sandwich.....	1,312.50	133.92	100.00	87.84				175.83		1,810.09
Tamworth.....	1,350.00	400.00	200.00	113.46			264.15	87.35		2,414.96
Tuftonborough..	757.50	200.00	100.00	50.63	700.00		109.38	131.84		2,049.35
Waketield.....	2,737.50	1,800.00		198.25	104.00	79.29	573.01	194.20		5,736.25
Wolfeboro.....	3,787.50	1,100.00		177.51	258.00		390.62	170.10	2,844.99	8,728.72
Total.....	\$21,255.00	\$11,686.42	\$1,235.00	\$1,797.67	\$1,105.40	\$112.88	\$4,287.80	\$2,031.97	\$3,175.26	\$46,687.40



TABLE No. VI.—

(For the year ending

EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Traut officers.	Transportation of pupils.
Albany .....	\$24.25		\$11.07	\$590.80			\$27.00		\$128.00
Bartlett, town district...	21.84			770.00			51.00	\$10.00	25.00
Bartlett, special district.	66.42		64.65	1,292.50		\$36.00		10.00	
Brookfield.....	35.00		23.54	615.00			25.00		
Chatham .....	48.40		9.40	658.00			22.00		36.00
Conway .....	300.77	\$62.16	212.48	5,766.80		117.37	200.00	15.00	1,011.50
Eaton .....	25.79		8.00	849.30			47.75		51.50
Effingham .....	73.44	3.50	10.23	1,344.00		105.68	60.00	6.00	
Freedom .....	70.21			816.00			45.00		155.00
Hart's Location .....									
Jackson, town district...	36.50	10.50		823.00		25.33	25.00		
Jackson, special district.	58.99	30.70	6.20	594.00			20.00		
Madison .....	129.23		1.87	966.00		36.00	55.00	5.00	51.10
Moultonborough.....	105.67			1,511.50			70.00		168.50
Ossipee .....	200.00	25.00	96.81	2,886.25		60.00	160.00	25.00	99.50
Sandwich .....	104.67		19.28	1,389.00			87.50		137.20
Tamworth .....	138.00		45.00	1,938.50			105.00		185.50
Tuftonborough .....	175.00	10.00		1,275.00	\$262.50		60.00	8.00	357.55
Wakefield .....	161.80		70.06	4,022.00	600.00	360.00	190.00	5.00	168.25
Wolfeboro .....	200.00	100.37		4,470.00	937.50				246.00
Total .....	\$1,975.98	\$242.23	\$578.59	\$32,577.65	\$1,800.00	\$740.38	\$1,250.25	\$84.00	\$2,820.60

## CARROLL COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$13.86			\$18.50	\$14.35	\$827.83				\$827.83	\$2.28	\$21.78
8.35		\$45.00	79.60	470.54	1,472.98				1,472.98	3.77	11.88
15.00		68.75	123.40	33.56	1,703.63			\$112.82	1,816.45	5.59	20.95
251.56	\$98.50	3.50	27.25		744.29				744.29	3.15	18.36
			25.00		813.80			214.00	1,027.80	5.03	18.93
		218.80	531.67	344.97	9,131.58				9,131.58	5.51	16.28
			24.07	25.38	1,031.79			53.55	1,085.34	7.23	14.53
		1.50	38.25	30.52	1,673.12			93.16	1,766.28	3.76	17.79
30.57			68.00		1,184.78				1,184.78	3.75	19.42
										5.10	
4.00		6.00	32.75		963.08			40.00	1,003.08	4.28	21.40
20.16		29.75	32.75	8.65	801.20			13.07	814.27	1.42	16.02
			21.75	308.68	1,574.63				1,574.63	5.83	23.50
15.50			70.90	39.50	1,981.57			300.00	2,281.57	3.42	13.57
			135.38		3,687.94			409.53	4,097.47	4.73	12.05
			82.93	352.37	2,172.95			335.56	2,508.51	2.97	19.93
40.35	40.00		48.00		2,540.35	\$5,000.00	\$27.00		7,567.35	3.58	14.11
55.00		36.44	49.50	97.70	2,386.69				2,386.69	3.22	30.48
194.52	40.00	191.90	281.61	12.86	6,298.00	1,848.00		156.57	8,392.57	6.23	22.02
		447.25	483.94	103.01	6,988.07			118.81	7,106.88	4.17	29.24
\$663.87	\$178.50	\$1,048.83	\$2,175.25	\$1,842.09	\$47,978.28	\$6,848.00	\$27.00	\$1,847.07	\$56,700.35	\$4.25	\$18.29

\* On one thousand dollars of inventoried valuation.



TABLE No. I.—CHESHIRE COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Alstead	8	8	2	1	29	20	27.30
Chesterfield	7	4	2	1	30	*10	30.00
Dublin	4	4	3		35	35	35.00
Fitzwilliam	6	6			34	33	33.83
Gilsum	3				25	23	25.00
Harrisville	4	2			33	35	33.00
Hinsdale	10	7			36	34	34.40
Jaffrey	11	6	2		31	24	29.45
Keene	38	38	2		36	36	36.00
Marlborough	8	8	1		36	24	35.70
Marlow	4		1		30	30	30.00
Nelson	2				27	27	27.00
Richmond	5		1	1	29	26	27.16
Rindge	6		6	1	32	25	29.83
Roxbury (no schools)							
Stoddard	3		3		23	21	22.76
Sullivan	4		2		26	*10	26.00
Surry	3				27	25	26.00
Swansey	11	4			33	29	31.96
Troy	5	5	1		36	33	35.00
Walpole	18	18			34	34	34.00
Westmoreland	5	5	1		32	29	31.00
Winchester	17	9	4		36	*11	30.40
Total	182	124	31	4			31.53

\* One term.

TABLE No. II.—CHESHIRE COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Alstead .....	9	1		11	\$4,500.00	\$400.00
Chesterfield .....	7			9	4,500.00	100.00
Dublin .....	5			6	5,000.00	250.00
Fitzwilliam .....	8	2		10	6,000.00	100.00
Gilsum .....	4			5	3,000.00	20.00
Harrisville .....	3			4	4,000.00	75.00
Hinsdale .....	5			13	10,000.00	1,000.00
Jaffrey .....	9	1		13	15,000.00	350.00
Keene .....	18		1	51	155,000.00	1,500.00
Marlborough .....	4			9	11,800.00	150.00
Marlow .....	6			7	1,800.00	100.00
Nelson .....	2			2	4,000.00	.....
Richmond .....	5			5	1,500.00	200.00
Rindge .....	3	1		9	6,700.00	250.00
Roxbury .....	3	2		3	500.00	.....
Stoddard .....	3			3	2,000.00	100.00
Sullivan .....	5			5	3,000.00	60.00
Surry .....	4			4	1,200.00	100.00
Swansey .....	8			13	12,500.00	400.00
Troy .....	4			8	14,300.00	250.00
Walpole .....	12	3		28	30,000.00	1,000.00
Westmoreland .....	11	2		12	5,000.00	250.00
Winchester .....	12	1		22	15,000.00	1,000.00
Total .....	155	13	1	252	\$316,300.00	\$7,655.00

TABLE No. III.—CHESHIRE COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Alstead .....	77	60	87	67	4	144	6				122	109	89		
Chesterfield .....	81	68	81	68		147	2				145	123	84	1	
Dublin .....	29	38	25	35	1	58	1		8		39	34	87		
Fitzwilliam .....	109	104	123	108		229	2			1	166	148	89		
Gilsum .....	32	45	32	34		65	1		3		54	51	94		1
Harrisville .....	71	68	71	73		144			5		141	133	94		
Hinsdale .....	166	198	179	204		364	19				337	304	89		
Jaffrey .....	217	213	191	195	4	377	5				294	243	82		
Keene .....	908	951	773	864	74	1,441	122	26			1,422	1,316	92	330	
Marlborough .....	166	150	160	151		311		5			278	245	88		
Marlow .....	50	42	55	39	1	90	3			1	68	61	89		
Nelson .....	11	7	20	14		33	1		1		32	30	93		
Richmond .....	53	43	53	52		164	1		1		87	75	85		
Rindge .....	58	61	69	66	2	132	1		3		109	95	87	1	
Roxbury † .....	4	1													
Stoddard .....	31	29	34	31	4	58	3				49	46	93		
Sullivan .....	28	21	34	31	1	61	3		2		61	57	93		
Surry .....	25	23	29	20		47	2		3		35	33	92		
Swanzey .....	157	180	172	170		338	4		16	3	298	256	86		
Troy .....	117	123	113	122		232	3		3		229	207	90		1
Walpole .....	340	317	360	380	8	678	54	4	334		691	629	91		
Westmoreland .....	63	49	74	56		120	10				96	88	91		
Winchester .....	228	197	260	220	2	473	5	3			398	355	89		
Total .....	3,021	2,988	2,995	3,000	101	5,646	248	38	81	5	5,151	4,638	90	334	2

\* Between five and sixteen inclusive.

† No schools.

‡ Number Walpole pupils sent to Bellows Falls.

## TABLE No. IV.—CHESHIRE COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Alstead			13	\$32.00	1		2		1
Chesterfield	1	\$34.00	10	32.00	1	1	1	1	
Dublin			5	45.00			4	1	
Fitzwilliam			6	36.66		4	1		
Gilsum	1	36.00	4	30.00		1			1
Harrisville			4	39.00			2		
Hinsdale			10	33.15	1		1		1
Jaffrey			11	34.90	1	2			
Keene	†		38	40.37	4		2	2	1
Marlborough			8	36.40			2	5	
Marlow			6	30.00	4	1		2	
Nelson			2	32.50				1	
Richmond			7	30.00	2	1			1
Rindge			11	31.33	3		2	1	1
Roxbury (no schools)									
Stoddard	1	31.00	3	27.67		1	1	1	
Sullivan			6	31.00		1	1		
Surry			4	21.00			1	1	
Swanzy	1	52.00	10	37.00		1	1	1	
Troy			7	34.86					
Walpole	1	82.35	24	38.10	2		9	4	4
Westmoreland	1	52.00	6	34.00			1	1	1
Winchester			19	30.00	3	1	2	1	2
Total	7	\$47.87	214	\$34.74	22	14	41	22	12

† The superintendent of schools is principal of a grammar school.



TABLE No. V.—CHESHIRE COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Alstead.....	\$1,327.50	\$247.50	\$179.80	\$87.84	\$179.24	.....	\$137.50	\$76.54	\$336.33	\$2,572.25
Chesterfield.....	1,717.50	.....	90.65	92.11	.....	.....	.....	209.20	192.88	2,302.34
Dublin.....	2,400.00	.....	.....	34.77	409.34	.....	125.00	208.62	23.71	3,201.44
Fitzwilliam.....	1,432.50	867.50	200.00	111.65	.....	\$2.45	167.50	218.20	260.49	3,260.29
Gilsum.....	660.00	140.00	25.00	42.35	18.00	.....	76.78	47.60	53.26	1,064.99
Harrisville.....	1,035.00	365.00	.....	95.77	22.00	.....	.....	147.00	20.00	1,684.77
Hinsdale.....	2,775.00	3,803.86	600.00	234.85	.....	.....	.....	479.40	.....	7,893.11
Jaffrey.....	3,112.50	1,650.00	200.00	244.75	150.00	.....	.....	196.00	.....	5,553.25
Keene.....	20,302.50	13,790.00	3,500.00	930.25	.....	.....	.....	923.35	1,142.66	40,588.76
Marlborough.....	2,227.50	1,213.24	300.00	177.51	489.10	.....	.....	293.70	76.00	4,777.05
Marlow.....	750.00	50.00	29.98	54.90	87.15	.....	.....	72.30	10.50	1,054.83
Nelson.....	405.00	145.60	.....	23.79	.....	.....	.....	57.60	7.00	638.39
Richmond.....	817.50	200.00	125.00	70.76	.....	.....	.....	82.40	369.40	1,665.06
Rindge.....	1,792.50	100.00	115.85	65.27	.....	.....	140.00	137.00	.....	2,350.62
Roxbury.....	225.00	.....	.....	.....	.....	.....	.....	.....	.....	225.00
Stoddard.....	510.00	.....	.....	38.43	.....	.....	55.86	94.20	.....	698.49
Sullivan.....	382.50	217.50	.....	37.82	.....	.....	83.77	.....	31.05	752.64
Surry.....	510.00	.....	.....	32.33	.....	.....	.....	71.40	26.00	639.73
Swanzy.....	2,167.50	1,132.50	250.00	230.58	.....	.....	.....	237.00	.....	4,017.58
Troy.....	1,597.50	1,100.00	300.00	155.55	24.00	2.45	548.46	195.15	.....	3,923.11
Walpole.....	4,657.50	8,500.00	1,000.00	415.41	.....	.....	1,207.74	240.58	50.95	16,072.18
Westmoreland.....	1,417.50	600.00	123.51	91.50	348.75	.....	114.50	144.80	324.37	3,164.93
Winchester.....	3,157.50	3,342.50	600.00	262.91	.....	.....	.....	306.90	120.55	7,790.36
Total.....	\$55,380.00	\$37,464.60	\$7,639.79	\$3,531.10	\$1,727.58	\$4.90	\$2,657.11	\$4,438.94	\$3,047.15	\$115,891.17

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Tenant officer.	Transportation of pupils.
Alstead.....	\$129.75		\$54.69	\$1,671.70	\$238.58				\$322.71
Chesterfield.....	43.33	\$2.50	44.82	1,698.00			\$105.00	\$11.00	500.88
Dublin.....	60.94	81.43	48.32	1,674.90	216.30	\$192.00	105.50		59.75
Fitzwilliam.....	82.14		72.01	1,893.00	282.05	58.00	75.00	7.75	403.78
Gilsum.....	4.44		20.67	587.00		30.00	57.00	5.60	224.70
Harrisville.....	33.76		226.22	1,110.00		104.00	75.00		
Hinsdale.....	249.97		265.94	5,298.17			150.00	10.00	137.35
Jaffrey.....	157.55	17.50	44.39	4,382.00			72.00	10.00	167.60
Keene.....	1,500.00	50.00	2,000.00	22,447.96	1,200.00		240.00		306.25
Marlborough.....	168.00	39.00	132.00	3,407.75			134.00	10.00	317.84
Marlow.....	31.74		46.71	758.90		36.00	70.00		163.11
Nelson.....	30.95		3.83	452.00		40.00	23.00		32.47
Richmond.....	40.40		61.90	1,045.00		10.00	94.00	6.00	236.98
Rindge.....	74.97		40.88	1,379.50	238.16	80.00	89.00	3.00	299.66
Roxbury.....							16.00		59.20
Stoddard.....	5.50		24.39	545.20			40.00		61.77
Sullivan.....	50.02	24.00	32.01	673.00		60.00	51.20		113.54
Surry.....	21.63			548.00		90.00	30.00		17.50
Swanzey.....	165.01		84.94	3,198.50		600.00	150.00		248.52
Troy.....	141.15	30.03	103.48	2,630.00	286.14	40.00	130.00	3.05	309.80
Walpole.....	426.60	128.39	459.56	7,440.68	523.07	511.88			1,894.95
Westmoreland.....	60.00		63.51	1,416.50	219.54		25.00	16.00	200.00
Winchester.....	509.63	125.00		5,238.84					198.95
Total.....	\$3,987.54	\$497.85	\$3,836.27	\$69,496.60	\$3,203.84	\$1,851.88	\$1,731.70	\$82.40	\$6,217.31

## CHESHIRE COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$13.38		\$41.25	\$73.75	\$26.46	\$2,572.27				\$2,572.27	\$2.91	\$21.08
3.00		50.00	65.50		2,524.03			\$134.77	2,658.80	2.49	17.40
125.43		60.00	122.26	165.68	2,912.51				2,912.51	2.68	61.98
74.20	\$28.80	48.90	64.00	28.89	3,118.52				3,118.52	4.95	18.78
15.44	10.00	24.60	53.51	8.45	1,041.41				1,041.41	3.77	19.29
16.05		66.50	110.00	10.25	1,751.78				1,751.78	3.19	12.42
72.86		437.50	631.70	418.50	7,671.99				7,671.99	6.73	22.76
163.99		303.25	486.75	78.13	5,883.16			68.00	5,951.16	3.97	20.01
1,229.23	169.60	2,180.80	2,627.30	1,972.68	35,923.82	\$3,450.00	\$248.00	3,000.00	42,621.82	5.19	25.26
58.69	6.00	256.20	273.70	96.68	4,899.86			75.00	4,974.86	5.64	17.63
		18.00	30.00	12.00	1,166.46			40.00	1,206.46	3.35	17.15
29.37		14.00	30.57	10.08	666.27				666.27	3.37	20.82
53.91		37.32	51.10	35.69	1,672.30				1,672.30	3.94	19.22
30.88		49.10	61.80	28.79	2,384.84			100.00	2,484.84	3.41	21.88
				178.80	154.00				154.00	2.20	
1.85		6.00	23.00	10.10	717.81				717.81	2.44	14.65
		19.20	34.30		1,057.27				1,057.27	4.23	17.33
		18.50	22.80	7.55	755.98				755.98	2.95	21.59
264.13		132.35	121.66		4,965.11				4,965.11	3.43	15.16
17.76		274.40	237.54	37.49	4,246.84				4,246.84	4.78	18.54
34.14		655.00	960.72	566.01	13,541.00	5,663.00	1,631.15	600.00	21,435.15	7.17	18.67
	20.00	50.00	100.00	207.00	2,377.55		15.47	308.90	2,701.92	2.80	24.77
110.92		276.66	200.54	119.30	6,779.90			170.06	6,949.96	6.14	17.03
\$2,324.33	\$234.40	\$5,019.53	\$6,382.50	\$3,918.53	\$108,784.68	\$9,113.00	\$1,894.62	\$4,496.73	\$124,289.03	\$3.99	\$20.79

\* On one thousand dollars of inventoried valuation.

† \$73.80 for tuition.



TABLE No. I.—COOS COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Berlin.....	22	21	.....	.....	38	33	36.02
Carroll.....	6	2	.....	1	33	30	31.20
Clarksville.....	5	.....	3	1	25	*8	22.52
Colebrook, town district.....	12	.....	6	1	34	*10	30.18
Colebrook, special district.....	4	4	.....	.....	36	36	36.00
Columbia.....	10	.....	6	.....	26	21	23.40
Dalton.....	6	.....	2	2	29	26	27.66
Dummer.....	4	.....	.....	.....	23	20	22.00
Errol.....	3	.....	2	.....	30	*10	23.66
Gorham.....	14	8	.....	.....	35	25	31.21
Jefferson.....	9	.....	2	.....	32	31	31.16
Lancaster, town district.....	11	.....	1	.....	30	30	30.00
Lancaster, special district.....	8	8	.....	.....	35	35	35.00
Milan.....	8	.....	.....	.....	31	20	27.50
Northumberland.....	11	5	2	1	36	24	33.46
Pittsburg.....	9	.....	3	2	30	22	26.11
Randolph.....	2	.....	.....	1	24	24	24.00
Shelburne.....	3	.....	.....	1	22	22	22.00
Stark.....	6	.....	.....	.....	31	28	29.16
Stewartstown, town district.....	11	.....	4	2	22	22	22.00
Stewartstown †.....	2	2	.....	.....	36	36	36.00
Stratford.....	9	9	1	.....	36	36	36.00
Wentworth's Location.....	1	.....	.....	.....	26	26	26.00
Whitefield, town district.....	6	.....	4	.....	35	*12	33.40
Whitefield, special district.....	8	8	.....	.....	36	36	36.00
Total.....	190	67	36	12	.....	.....	30.16

\* Scholars conveyed.    † West Stewartstown district.

TABLE No. II.—COOS COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Berlin .....	7	.....	2	29	\$116,200.00	\$3,650.00
Carroll .....	6	.....	.....	8	7,200.00	600.00
Clarksville .....	5	.....	.....	6	1,800.00	5.00
Colebrook, town district .....	12	.....	.....	12	8,000.00	100.00
Colebrook, special dist. ....	2	.....	.....	9	13,000.00	500.00
Columbia .....	10	.....	.....	10	4,000.00	500.00
Dalton .....	6	.....	.....	6	2,500.00	.....
Dummer .....	5	.....	.....	5	2,000.00	200.00
Errol .....	3	.....	.....	4	3,000.00	375.00
Gorham .....	7	.....	.....	18	20,000.00	500.00
Jefferson .....	9	.....	.....	12	10,000.00	200.00
Lancaster, town district .....	11	.....	.....	11	8,800.00	225.00
Lancaster, special dist. ....	2	.....	.....	9	15,000.00	500.00
Milan .....	7	.....	.....	9	6,000.00	100.00
Northumberland .....	9	.....	.....	12	12,000.00	1,000.00
Pittsburg .....	8	.....	.....	9	4,400.00	360.00
Randolph .....	2	.....	.....	2	1,000.00	50.00
Shelburne .....	4	.....	.....	4	3,000.00	300.00
Stark .....	7	.....	.....	8	3,500.00	400.00
Stewartstown, town dist. ....	12	.....	.....	12	6,000.00	1.00
Stewartstown * .....	1	.....	.....	2	2,000.00	500.00
Stratford .....	11	2	.....	15	8,500.00	500.00
Wentworth's Location .....	1	.....	.....	1	500.00	12.00
Whitefield, town district .....	7	.....	.....	7	2,000.00	100.00
Whitefield, special dist. ....	1	.....	.....	9	22,000.00	150.00
Total .....	155	2	2	229	\$282,400.00	\$10,828.00

\* West Stewartstown district.

TABLE No. III.—COOS COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Berlin.....	1,290	1,370	604	490	...	1,000	94	2	...	...	946	846	89	1,600	...
Carroll.....	51	48	55	51	3	102	1	...	4	...	106	98	92	...	...
Clarksville.....	42	24	65	55	...	118	2	...	...	...	120	105	87	...	2
Colebrook, town.....	89	79	109	96	5	198	2	...	...	9	167	147	88	...	...
Colebrook, special.....	83	101	121	159	5	239	36	32	...	...	228	205	89	...	...
Columbia.....	64	70	73	65	...	133	5	...	6	...	138	116	84	...	...
Dalton.....	50	42	66	47	...	109	4	...	...	...	110	80	72	...	...
Dummer.....	30	23	29	25	...	54	...	...	1	...	50	43	86	...	...
Errol.....	21	17	24	16	1	36	3	...	...	...	33	31	90	...	...
Gorham.....	197	227	227	253	...	464	16	3	...	...	435	396	90	5	...
Jefferson.....	104	82	113	108	...	201	20	...	...	...	190	154	81	...	...
Lancaster, town.....	114	83	121	87	3	195	10	...	...	12	174	147	84	...	...
Lancaster, special.....	199	190	226	230	...	408	48	17	...	...	425	393	92	...	...
Milan.....	101	101	105	105	3	199	8	...	5	...	181	162	89	4	...
Northumberland.....	174	187	199	201	1	389	10	...	5	...	364	321	88	2	...
Pittsburg.....	78	65	83	64	4	138	5	...	...	...	117	100	85	...	...
Randolph.....	10	14	15	11	1	25	...	...	...	...	26	20	77	...	...
Shelburne.....	14	22	25	25	...	48	2	...	...	...	50	44	88	...	2
Stark.....	60	59	77	70	4	139	4	...	...	...	144	137	94	...	...
Stewartstown †.....	62	63	77	75	2	140	10	...	2	2	152	136	89	...	...
Stewartstown ‡.....	43	44	56	56	...	112	...	...	...	...	73	66	89	...	...
Stratford.....	177	151	161	169	...	322	8	8	...	...	330	315	92	...	...
Wentworth's Loc'n.....	13	9	16	12	1	24	3	...	...	...	20	12	60	...	1
Whitefield, town.....	32	40	39	37	...	72	4	...	10	...	74	65	87	...	...
Whitefield, special.....	146	122	176	175	...	309	42	14	...	...	302	267	88	...	...
Total.....	1,898	1,817	2,862	2,682	33	5,174	337	76	33	23	4,955	4,406	89	1,611	5

\* Between five and sixteen inclusive.

† Town district.

‡ West Stewartstown district.



TABLE No. IV.—COOS COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Berlin .....	2	\$42.00	27	\$42.94	11	20	2	2	2
Carroll .....			2	32.20	1	1		1	
Clarksville .....	1	28.00	7	21.40	12	7			
Colebrook, town .....			12	22.66	1	8	2	1	
Colebrook, special .....	2	98.33	5	42.57	1		4	4	3
Columbia .....	1	16.00	23	16.15	2	23	1		
Dalton .....	1	28.00	11	28.00			2		
Dummer .....	1	28.00	6	28.00	3		1		
Errol .....			5	20.00	1	2	1	1	
Gorham .....			14	34.00	2		1		2
Jefferson .....			9	28.44	2	1		1	
Lancaster, town .....			18	29.53	3	4	3		1
Lancaster, special .....			8	50.15			7		
Milan .....			11	32.00	3	2	1	3	
Northumberland .....			12	34.67	1		1	2	1
Pittsburg .....	2	28.00	13	26.61		13		2	
Randolph .....			2	30.00				1	
Shelburne .....			3	29.33	1				
Stark .....	1	32.00	8	33.37		5			
Stewartstown* .....	1	28.00	10	15.00	2	8			
Stewartstown† .....	1	66.66	2	40.00				1	
Stratford .....			11	41.00	1		7	2	3
Wentworth's Loc'n .....	1	44.00	1	28.00					1
Whitefield, town .....			11	28.33	2	3			
Whitefield, special .....			8	35.00			3	2	
Total .....	14	\$43.38	245	\$30.58	39	78	54	21	13

\* Town district.

† West Stewartstown district.

TABLE No. V.—COOS COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Berlin .....	\$9,255.00	\$13,426.48	\$3,507.19	\$533.14				\$479.82	\$2,776.14	\$29,977.77
Carroll .....	1,725.00	537.50	250.00	68.32		\$28.23		54.00	321.83	2,984.88
Clarksville .....	412.50	100.00		52.46				49.40		614.36
Colebrook, town .....	1,687.90		200.00	91.08			\$310.08	91.00		2,380.06
Colebrook, special .....	1,079.60	2,400.00	400.00	170.00			519.04	300.00	700.00	5,568.64
Columbia .....	952.50	547.50		86.62			148.12	89.91		1,824.65
Dalton .....	480.00	520.00		75.64			162.15	43.95		1,281.74
Dummer .....	420.00	780.00		32.94				52.40	52.72	1,338.06
Errol .....	532.50	167.50		22.57						722.57
Gorham .....	1,815.00	7,185.00		289.75			980.29	77.68	60.00	10,407.72
Jefferson .....	1,417.50	1,582.50		132.98			392.29	167.14		3,692.41
Lancaster, town .....	1,948.45	842.36	354.91	143.48	\$76.88	112.24		62.02	6.03	3,546.37
Lancaster, special .....	3,601.55	4,578.29	975.47	265.22	142.12			114.63	533.35	10,210.63
Milan .....	1,162.50	937.50	200.00	136.03			362.20	141.00		2,939.23
Northumberland .....	2,460.00	3,500.00	800.00	251.93		32.47	761.34	144.47		7,950.21
Pittsburg .....	1,852.50	200.00		93.33				42.00		2,187.83
Randolph .....	285.00	100.00		11.55				32.45	37.75	466.75
Shelburne .....	480.00			21.96				37.80		539.76
Stark .....	907.50	400.00		82.96	16.45		176.61	57.60		1,641.12
Stewartstown * .....	740.00	515.65		86.01		8.97	212.21	87.48		1,650.32
Stewartstown † .....	475.00	1,125.00		54.29			129.12	58.32		1,841.73
Stratford .....	1,440.00	3,200.00	500.00	192.76			1,237.47	85.20	240.00	6,895.43
Wentworth's L'c'n .....	157.50	117.50		20.74					2.00	297.74
Whitefield, town .....	710.45			68.73	1.00	91.35	201.68	43.50		1,116.69
Whitefield, spec. .....	1,667.05	1,600.00	267.33	161.85	5.87		434.86	146.89	539.25	4,823.10
Total .....	\$37,665.00	\$44,362.78	\$7,454.90	\$3,146.34	\$242.32	\$273.26	\$6,027.44	\$2,458.66	\$5,269.07	\$106,899.77

\* Town district. † West Stewartstown district.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Berlin.....	\$1,582.94	\$1,402.21	\$1,924.25	\$14,389.75	\$1,500.00		\$200.00	\$360.00	\$615.00
Carroll.....	182.00	32.00	36.00	1,510.35		\$136.00	55.00	18.00	172.00
Clarksville.....	2.00		10.00	430.52			14.50		
Colebrook, town.....	145.80		20.00	2,048.92		189.00	101.00	15.00	20.00
Colebrook, special.....	400.00	50.00	75.00	3,436.46	400.00			36.00	
Columbia.....	16.80		5.53	957.50		119.00	85.00		
Dalton.....		77.47	20.91	949.00		215.00	75.00	5.00	
Dummer.....	9.10		633.20			30.00	50.00		
Errol.....	36.00		2.00	540.00		14.00	52.36		
Gorham.....	682.69			5,051.75			129.00		178.80
Jefferson.....	200.00		15.00	2,730.15			100.00		145.95
Lancaster, town.....	190.67		187.32	2,447.00		289.00	125.00	14.00	12.80
Lancaster, special.....	633.43	134.17	342.04	6,430.72				5.00	
Milan.....	150.71	42.00		1,855.76		101.60	100.00	1.25	76.25
Northumberland.....	408.66	77.56	124.40	4,621.00	400.00	241.00	101.00	25.00	541.00
Pittsburg.....	106.00	10.00	46.25	1,656.50			91.50		125.00
Randolph.....	19.22		3.66	360.00			6.75		
Shelburne.....	13.17	8.50		414.00			20.00	2.00	90.00
Stark.....	100.00	30.00	120.00	1,469.00			92.90		54.25
Stewartstown *.....	50.12		25.00	907.50		21.00	113.25	14.75	36.00
Stewartstown †.....	71.63		67.38	960.00			42.00	14.00	319.50
Stratford.....	247.61	105.00	146.50	4,089.74	400.00			10.00	886.00
Wentworth's L'e'n.....	27.72		1.00	222.00			5.00		
Whitefield, town.....	32.07		49.44	1,269.00		183.00	75.00	10.00	82.16
Whitefield, special.....	129.27		209.29	4,761.30				30.00	
Total.....	\$5,437.61	\$1,968.91	\$3,430.97	\$64,141.12	\$2,700.00	\$1,538.68	\$1,634.26	\$560.00	\$3,354.71

\* Town district.      † West Stewartstown district.

## COOS COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	† Rate of school assessment.	Average of current expenditure per pupil.
\$2,011.85	\$1,095.41	\$1,566.66	\$2,098.00	\$1,231.70	\$29,977.77	.....	.....	.....	\$29,977.77	\$3.94	\$31.69
.....	.....	77.10	140.50	38.00	2,396.95	.....	.....	\$235.36	2,632.31	2.88	22.61
5.00	.....	5.00	100.40	.....	567.42	.....	.....	10.00	577.42	2.56	4.73
.....	.....	22.80	172.33	.....	2,734.85	.....	.....	202.67	2,937.52	3.15	15.54
25.00	.....	180.00	175.00	25.00	4,802.46	.....	\$355.00	.....	5,157.46	7.76	20.36
.....	.....	35.00	80.00	23.57	1,322.40	.....	.....	.....	1,322.40	4.94	19.58
.....	.....	12.00	65.00	17.95	1,437.33	.....	.....	.....	1,437.33	5.80	13.07
14.00	.....	14.05	28.19	33.14	812.28	.....	.....	.....	812.28	3.25	16.25
20.00	.....	.....	30.00	.....	694.36	.....	.....	.....	694.36	2.11	21.04
.....	56.75	.....	467.70	538.33	7,105.02	\$5,000.00	229.00	.....	12,394.02	6.24	16.33
25.00	.....	94.50	207.25	.....	3,517.85	.....	.....	.....	3,517.85	7.55	18.52
10.23	.....	24.40	161.60	41.21	3,503.23	.....	.....	.....	3,503.23	6.15	18.83
64.75	.....	461.71	658.08	819.06	9,548.96	.....	98.97	150.17	9,798.10	7.57	22.47
.....	.....	49.50	64.18	14.21	2,455.46	.....	.....	.....	2,455.46	5.81	13.57
397.08	16.50	181.80	206.28	286.99	7,628.27	.....	.....	.....	7,628.27	6.65	20.96
.....	.....	44.00	68.00	20.00	2,167.25	.....	.....	.....	2,167.25	1.86	18.52
42.00	.....	7.30	18.50	8.00	465.43	.....	.....	.....	465.43	2.77	17.90
.....	.....	.....	18.00	5.00	570.67	.....	.....	.....	570.67	1.44	11.41
20.31	.....	26.25	92.73	31.25	2,036.69	.....	.....	.....	2,036.69	3.28	14.14
.....	.....	.....	70.62	.....	1,238.24	.....	.....	50.00	1,288.24	4.55	18.14
.....	.....	30.00	77.50	3.00	1,585.01	35.03	.....	.....	1,633.92	7.19	21.71
.....	.....	153.75	280.34	241.62	6,560.56	.....	20.08	13.80	6,885.56	8.47	19.88
.....	.....	.....	10.50	5.00	271.22	.....	95.00	230.00	271.22	3.45	13.56
32.67	.....	43.05	96.00	32.88	1,905.35	.....	.....	.....	1,905.35	3.37	22.68
.....	210.00	370.00	474.75	636.49	6,821.10	.....	700.00	.....	7,521.10	10.46	22.58
\$2,668.49	\$1,378.66	\$3,398.87	\$5,861.45	\$4,052.40	\$102,126.13	\$5,035.03	\$1,498.05	\$892.00	\$109,551.21	\$4.95	\$20.36

† On one thousand dollars of inventoried valuation.



TABLE No. I.—GRAFTON COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any term.	Least number.	Average number of weeks.
Alexandria.....	9	.....	4	2	25	22	23.49
Ashland, town district.....	2	.....	.....	.....	22	22	22.00
Ashland, special district.....	6	6	.....	.....	36	36	36.00
Bath, town district.....	6	.....	2	1	35	29	30.66
Bath, special district.....	2	2	.....	.....	36	36	36.00
Benton.....	3	.....	.....	.....	25	25	25.00
Bethlehem, town district.....	6	.....	2	.....	30	20	28.00
Bethlehem, special district.....	3	3	.....	1	35	35	35.00
Bridgewater.....	3	.....	2	1	26	25	25.33
Bristol, town district.....	4	.....	3	1	24	24	24.00
Bristol, special district.....	5	5	.....	.....	36	36	36.00
Campton.....	9	9	4	.....	31	27	29.77
Canaan, town district.....	10	.....	5	.....	27	*16	25.44
Canaan, special district.....	2	2	.....	.....	36	35	35.50
Dorchester.....	6	.....	2	2	22	22	22.00
Easton.....	3	.....	2	.....	22	21	21.33
Ellsworth.....	1	.....	.....	.....	20	20	20.00
Enfield.....	14	14	6	.....	36	23	29.39
Franconia.....	3	.....	.....	.....	36	36	36.00
Grafton.....	9	.....	1	2	26	23	25.50
Groton.....	4	.....	4	.....	20	20	20.00
Hanover, town district.....	6	6	2	.....	34	28	31.17
Hanover, special district.....	4	4	.....	.....	36	36	36.00
Haverhill, town district.....	14	14	.....	.....	32	32	32.00
Haverhill, Woodsville district.....	6	6	.....	.....	36	36	36.00
Hebron.....	2	.....	.....	.....	30	30	30.00
Holderness.....	6	.....	2	1	26	26	26.00
Landaff.....	6	.....	1	2	29	*10	26.80
Lebanon, town district.....	12	12	3	1	36	36	36.00
Lebanon, special district.....	14	14	.....	.....	36	36	36.00
Lebanon, West Lebanon district.....	3	3	.....	.....	36	36	36.00
Lincoln.....	4	3	.....	.....	36	32	35.00
Lisbon, town district.....	6	.....	4	.....	26	25	25.25
Lisbon, special district.....	4	4	.....	.....	36	36	36.00
Lisbon, Sugar Hill district.....	1	.....	.....	.....	30	30	30.00
Littleton.....	20	20	.....	.....	36	36	36.00
Lynman.....	5	.....	2	.....	32	*9	23.93
Lyme.....	12	.....	3	2	30	27	29.60
Monroe.....	5	.....	1	.....	32	20	28.50
Orange.....	3	.....	3	.....	21	21	21.00
Orford.....	7	7	.....	1	33	22	31.43
Piermont.....	6	6	1	.....	31	24	29.33
Plymouth.....	10	10	2	1	34	32	34.07
Rumney.....	6	2	.....	.....	32	31	31.63
Thornton.....	7	.....	6	1	26	21	23.42
Warren.....	10	7	4	1	30	*10	25.00
Waterville (no schools).....	.....	.....	.....	.....	.....	.....	.....
Wentworth.....	8	2	5	1	30	*11	26.28
Woodstock.....	4	2	.....	1	36	34	35.25
Total.....	301	149	76	22	.....	.....	29.53

\* Scholars conveyed.

TABLE No. II.—GRAFTON COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Alexandria .....	9			9	\$3,000 00	\$800.00
Ashland, town district .....	3			3	2,000.00	200 00
Ashland, special district .....	1			6	20,000.00	500 00
Bath, town district .....	7			7	4,700.00	400.00
Bath, special district .....	1			4	3,500 00	200.00
Benton .....	3			3	1,500 00	100.00
Bethlehem, town district .....	9			10	6,000 00	300.00
Bethlehem, special district .....	1			6	5,000 00	250.00
Bridgewater .....	6			6	1,800 00	250.00
Bristol, town district .....	5			5	1,500 00	400 00
Bristol, special district .....	1			5	20,000 00	300.00
Campton .....	12			12	5,000 00	150 00
Canaan, town district .....	12	1		12	5,000.00	300 00
Canaan, special district .....	1			4	5,000 00	100 00
Dorchester .....	6			6	2,000.00	200.00
Easton .....	3			3	1,500 00	100.00
Ellsworth .....	1			1	500.00	10.00
Enfield, town district .....	11			14	5,500.00	100.00
Franconia .....	3			6	5,000.00	500 00
Grafton .....	10			10	5,500.00	100.00
Groton .....	4			4	1,000.00	50 00
Hanover, town district .....	11			11	4,000 00	200.00
Hanover, special district .....	1			8	24,500.00	800 00
Haverhill, town district .....	11			16	15,000.00	450 00
Haverhill, Woodsville dist. ....	1			7	30,000.00	300.00
Hebron .....	2			2	800 00	25.00
Holderness .....	9			9	3,000 00	200.00
Landaff .....	6			6	3,000 00	50 00
Lebanon, town district .....	10		1	15	14,000.00	170.00
Lebanon, special district .....	3			21	50,000 00	1,000.00
Lebanon, West Lebanon dist. ....	1			4	12,000 00	100.00
Lincoln .....	2			4	5,000.00	50.00
Lisbon, town district .....	8			8	6,000 00	400.00
Lisbon, special district .....	1			5	31,000.00	500.00
Lisbon, Sugar Hill district .....	1			1	800 00	50.00
Littleton .....	14			25	63,465.00	800.00
Lyman .....	6			6	4,000 00	75.00
Lyme .....	12	1	1	14	5,500.00	150.00
Monroe .....	4	2		5	3,250 00	150.00
Orange .....	5	1		5	1,000 00	.....
Orford .....	4			6	6,000 00	.....
Piermont .....	8			9	4,800 00	200.00
Plymouth .....	8			30	140,000.00	6,400.00
Rumney .....	5			6	4,800 00	250 00
Thornton .....	7			7	3,500 00	50.00
Warren .....	8	2		10	5,500 00	.....
Waterville (no schools) .....						
Wentworth .....	9			10	4,500 00	150 00
Woodstock .....	4			4	3,500 00	100.00
Total .....	270	7	2	390	\$548,965.00	\$17,930.00



TABLE No. III.—GRAFTON COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant-officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Alexandria.....	48	40	59	51	1	100	9			2	89	72	80		
Ashland, town...	10	15	10	13		23					23	20	87		
Ashland, special...	112	117	149	138	10	274	3		10	4	235	209	89	12	
Bath, town.....	44	43	63	50		112	1		12		78	71	91		
Bath, special.....	29	22	25	20		43	2		4		40	35	87		
Benton.....	29	11	32	10	1	41					40	35	87		
Bethlehem, town...	82	74	56	51	4	102	1		24		73	60	82		
Bethlehem, spec'l...	32	29	61	47		87	21	1			77	69	89		
Bridgewater.....	16	15	16	15		29	2		1		26	25	95		
Bristol, town.....	27	19	29	18		46	1		3		45	41	91		
Bristol, special...	75	78	88	90		162	16	1		20	146	130	89		
Campton.....	64	62	73	69	1	137	4		10	1	110	101	91		1
Canaan, town.....	74	97	86	88	1	171	4		1	1	174	145	83		
Canaan, special...	47	46	53	47		93	7	11	2		80	69	86		
Dorchester.....	37	26	50	29		79					64	56	87		
Easton.....	28	14	35	14		49				2	36	33	91		
Ellsworth.....	8	11	8	9		17					16	15	94		
Enfield.....	129	156	156	184	6	328	6		2	4	263	239	91		
Franconia.....	42	46	52	50		102		11			84	73	87		
Grafton.....	62	52	72	62	5	122	7			7	108	93	86		
Groton.....	30	26	30	26		56					46	41	90		
Hanover, town.....	75	77	65	60		125			9	2	93	82	87	1	
Hanover, special...	87	93	122	137	4	214	41	23			232	216	93		
Haverhill, town...	189	191	188	206		368	26	12			332	283	85		
Haverhill †.....	155	138	182	170		313	39	5			341	268	86	3	4
Hebron.....	15	16	15	21		32	4		2		33	30	91		
Holderness.....	51	50	51	47		96	2		7		77	70	91		
Landaff.....	56	45	53	40	2	91			3		75	62	83		
Lebanon, town.....	164	159	153	154	3	304			29	1	257	229	89		
Lebanon, special...	234	271	282	319		523	78	34			518	483	93		
Lebanon‡.....	69	66	73	73	3	131	12				131	113	86		
Lincoln.....	58	60	62	61		123			11		101	90	89	3	
Lisbon, town.....	54	52	57	55	4	105	3		5	8	75	66	87		
Lisbon, special...	118	116	157	138	1	274	20	20			245	219	89		
Lisbon §.....	15	8	11	7		18			2	2	16	15	94		
Littleton.....	399	422	433	437	1	797	72	16			740	644	87		
Lyman.....	46	46	38	38	1	70	5		5		75	64	85		
Lyme.....	95	105	108	113		214	7		1	1	142	131	92		
Monroe.....	53	52	58	51	2	104	3		1		89	76	85		
Orange.....	26	19	27	24		49	2				50	42	84		5
Orford.....	85	75	61	78	1	133	5		1	4	138	123	89		
Piermont.....	57	64	64	64	1	126	1				95	84	88		
Plymouth.....	176	159	245	255	4	428	68	74			420	371	88		
Rumney.....	79	75	75	74		148	1		17		115	106	92		
Thornton.....	58	42	60	41	3	96	2		2		79	69	87		
Warren.....	73	75	81	73		151	3		3	2	123	105	86		
Waterville.....															
Wentworth.....	50	47	74	62	1	133	2		5	2	96	83	86		
Woodstock.....	65	50	55	85	1	139			11		105	91	87		
Total.....	3,627	3,572	4,053	3,964	61	7,478	478	208	183	63	6,616	5,847	88	9	10

\* Between five and sixteen inclusive.

† Woodsville district.

‡ West Lebanon district.

§ Sugar Hill district.

|| No school.

## TABLE No. IV.—GRAFTON COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Alexandria.....	1	\$24.00	11	\$25.00	1	1	.....	.....	.....
Ashland, town district..	.....	.....	3	30.00	.....	1	.....	.....	.....
Ashland, special dist.	.....	.....	6	42.50	1	.....	4	1	.....
Bath, town district.....	.....	.....	10	33.00	3	1	1	.....	.....
Bath, special district...	1	55.55	1	36.00	.....	.....	.....	.....	1
Benton.....	.....	.....	6	20.00	2	.....	1	1	.....
Bethlehem, town dist..	2	34.00	9	31.60	2	.....	.....	.....	.....
Bethlehem, special dist.	.....	.....	3	36.00	.....	.....	3	.....	1
Bridgewater.....	.....	.....	5	24.60	1	.....	.....	.....	.....
Bristol, town district...	1	28.00	5	26.00	2	.....	.....	.....	.....
Bristol, special district.	.....	.....	5	40.00	.....	.....	2	2	.....
Campton.....	1	28.00	12	27.00	1	4	3	3	1
Canaan, town district...	.....	.....	10	30.44	1	1	.....	.....	.....
Canaan, special district.	.....	.....	3	34.66	.....	.....	2	.....	.....
Dorchester.....	.....	.....	6	14.00	4	5	1	.....	1
Easton.....	.....	.....	6	27.00	2	1	.....	.....	.....
Ellsworth.....	.....	.....	2	28.00	.....	.....	.....	.....	.....
Enfield.....	2	54.89	15	33.42	.....	1	1	1	.....
Franconia.....	.....	.....	3	49.33	1	.....	1	1	.....
Grafton.....	2	38.00	14	27.80	.....	5	1	.....	.....
Groton.....	.....	.....	4	24.00	.....	.....	.....	.....	.....
Hanover, town district...	.....	.....	10	27.93	2	2	.....	.....	.....
Hanover, special dist. ....	.....	.....	4	48.75	.....	.....	2	2	.....
Haverhill, town district	.....	.....	13	31.00	3	3	4	4	.....
Haverhill * town district	.....	.....	7	41.33	.....	.....	4	1	1
Hebron.....	.....	.....	2	28.00	.....	1	.....	.....	.....
Holderness.....	2	31.00	5	31.76	1	4	1	.....	.....
Landaff.....	.....	.....	9	26.11	2	5	.....	.....	.....
Lebanon, town district...	3	35.89	12	26.49	1	1	3	.....	.....
Lebanon, special dist. ...	1	80.00	15	37.28	.....	.....	3	1	1
Lebanon† special dist. ....	.....	.....	3	40.00	1	.....	.....	.....	.....
Lincoln.....	.....	.....	4	36.50	.....	.....	2	.....	1
Lisbon, town district...	.....	.....	9	25.00	2	2	2	.....	.....
Lisbon, special district...	.....	.....	4	45.27	.....	1	4	.....	.....
Lisbon, Sugar Hill dist.	.....	.....	2	34.12	.....	1	.....	.....	.....
Littleton.....	.....	.....	22	37.95	6	4	15	.....	.....
Lyman.....	1	30.00	9	28.86	2	1	.....	.....	.....
Lyme.....	1	36.00	24	28.21	7	16	.....	.....	.....
Monroe.....	1	22.00	8	24.66	1	2	.....	.....	.....
Orange.....	1	20.00	3	24.00	1	4	.....	.....	.....
Orford.....	1	36.00	10	34.20	2	4	.....	.....	.....
Piermont.....	.....	.....	9	27.87	.....	.....	.....	.....	.....
Plymouth.....	.....	.....	15	49.77	3	2	13	1	1
Ramsey.....	.....	.....	11	31.00	1	1	4	1	1
Thornton.....	.....	.....	9	28.00	.....	1	2	3	.....
Warren.....	.....	.....	15	32.45	2	4	1	1	.....
Waterville (no schools).	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wentworth.....	.....	.....	12	30.00	2	.....	1	.....	.....
Woodstock.....	.....	.....	6	35.50	1	2	1	.....	.....
Total.....	21	\$37.29	391	\$30.18	61	82	81	23	9

\* Woodsville district.

† West Lebanon district.

TABLE No. V.—GRAFTON COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Alexandria .....	\$742.50	\$100.00		\$67.10	\$18.00			\$128.40	\$156.84	\$1,212.84
Ashland, town..	175.00	502.50		19.27				18.78		715.55
Ashland, special.	1,595.00	1,552.50		173.49				169.02		3,490.01
Bath, town.....	760.00	600.00	\$200.00	68.70	16.00					1,644.70
Bath, special....	642.50	477.36	75.00	38.05	9.78				172.64	1,415.33
Benton.....	367.50	132.50		26.84			\$62.26	49.94	44.25	683.29
Bethlehem, town	1,258.13	1,300.00	200.00	87.23		\$288.46		110.00	1,098.00	3,243.82
Bethlehem, spec.	1,029.37	1,200.00	200.00	71.37				90.00		3,668.74
Bridgewater.....	390.00			25.01				72.13	69.29	557.41
Bristol, town....	527.68	275.00		29.92		68.89		28.00		929.49
Bristol, special...	2,539.82	1,000.00	162.02	114.65		113.28		87.08	54.00	4,070.85
Campton.....	1,380.00	745.00	150.00	82.96	39.50	100.87	142.84	108.00	11.00	2,780.17
Canaan, town....	1,160.00	1,000.00		135.86				122.85		2,418.71
Canaan, special..	670.00	500.00		63.95				71.00		1,304.95
Dorchester.....	270.00	150.00		48.19			179.85	71.40	42.75	762.19
Easton.....	382.50	200.00		20.74	24.00			37.46		664.70
Ellsworth.....	60.00	15.00		11.59				99.51	3.45	189.55
Enfield.....	2,460.00	1,500.00	669.04	200.69	100.00	31.00	210.00	317.33	884.55	6,372.61
Franconia.....	1,335.00	500.00		53.68	26.50		180.00	100.00	104.00	2,299.18
Grafton.....	1,140.00	100.00		89.10	136.65		164.00	132.43	4.00	1,766.18
Groton.....	315.00	200.00		45.10			103.52	34.40	22.00	720.02
Hanover, town....	1,191.40	1,048.00	90.35	77.65	30.24	29.12	100.00	111.71	10.00	2,688.47
Hanover, special.	2,918.60	1,340.00	683.62	127.31	72.96			269.65	1,384.92	6,797.06
Haverhill, town..	2,386.35	1,252.93	854.00	248.34	765.83		621.64	220.31	65.00	6,414.37
Haverhill*.....	2,023.65	4,776.93	341.25	207.33	88.37		461.00	198.64	586.50	8,683.67
Hebron.....	330.00	50.00		22.57				38.08		440.65
Holderness.....	1,042.50	350.00	50.00	74.42		93.65		134.40		1,744.97
Landaff.....	810.00			64.05				84.04		958.09
Lebanon, town....	2,040.05	3,200.00		158.91			280.00	141.48	1,468.00	7,546.56
Lebanon, special.	4,889.67	6,500.00		380.87			390.00	339.10	3,954.82	16,454.46
Lebanon†.....	1,050.28	2,200.00		81.81				72.84		3,404.93
Lincoln.....	1,432.50	300.00		84.79				35.00	429.40	2,281.69
Lisbon, town....	1,137.32	664.36		76.20				72.70		1,950.58
Lisbon, special...	2,536.16	4,383.06	509.21	169.25				161.47	953.44	8,702.59
Lisbon‡.....	251.52	37.58		16.85				16.08	6.00	328.03
Littleton.....	6,097.50	9,152.50		514.84			720.00	469.84	752.00	17,706.68
Lyman.....	495.00	200.00		63.44		8.88	204.16	108.00	213.17	1,292.65
Lyme.....	1,560.00	3,800.00		126.88	161.03	47.58		138.60		5,834.09
Monroe.....	742.50	150.00	113.50	79.91			100.33	22.00	60.17	1,268.41
Orange.....	180.00	120.00		21.96			69.99		10.50	402.45
Orford.....	1,117.50	800.00	116.98	107.97	95.66	19.64	455.67	139.60	797.49	3,650.51
Piermont.....	960.00	650.00	119.37	87.23	159.00	11.66	264.89	75.00	226.87	2,554.02
Plymouth.....	3,825.00	9,000.00		240.95				232.60	2,469.83	15,768.38
Rumney.....	1,357.50	545.00	150.00	108.58		135.82	140.58	132.79	111.98	2,682.25
Thornton.....	562.50	500.00		78.08	78.75			169.62	74.00	1,462.95
Warren.....	1,110.00	301.00	272.38	100.04	139.63	15.42	416.45	130.40	74.94	2,560.26
Waterville.....										
Wentworth.....	825.00	500.00		84.79	7.50	68.22	133.53	114.00		1,833.04
Woodstock.....	735.00	516.00		81.74	35.00		188.18	67.20		1,653.12
Total.....	\$62,797.50	\$64,417.19	\$5,056.72	\$4,960.25	\$2,024.40	\$1,291.59	\$5,858.02	\$5,351.20	\$16,238.35	\$167,995.22

\* Woodsville district.

† West Lebanon district.

‡ Sugar Hill district.

§ No schools.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Traut officers.	Transportation of pupils.
Alexandria.....	\$19.23		\$12.64	\$1,302.50		\$65.34	\$90.00	\$6.00	\$2.50
Ashland, town.....	11.68		8 40	330.00			23.00		
Ashland, special.....	167.87		105.40	2,284.00	\$125.00	465.67		50.00	
Bath, town.....	100.00	\$1.50	55.05	1,315.00		330.00	90.35		14 00
Bath, special.....	63.26	3.00	10.51	824.00		96.00	15.00		
Benton.....	17.67		11.46	525.00			20.00		
Bethlehem, town.....	83.82		72.26	1,225.60		550.83	79.00		190.00
Bethlehem, spec.....	100 00	100 00	50.00	2,600.00			50 00		
Bridgewater.....	21.95		5 07	468 00		27.33	25.00		31.00
Bristol, town.....	39.24		15.88	442.00		91.66	45.00	8.00	54.50
Bristol, special.....	92.82		69.20	2,340.00		355 65	70.00	150.00	
Campton.....	75.00		40.00	1,840 40		350.00	106 00		
Canaan, town.....	225.01	12.00	6.00	1,865.00		92.00	60.00	16 00	217.00
Canaan, special.....	120.00	13.00	33.00	1,105.00		80 00	50.00	9.00	
Dorchester.....			15.91	464.00			46.80	5.00	72.80
Easton.....	40.83		10.28	429.00			20.00	4.00	
Ellsworth.....	20.00		3 00	135.00			16.00	5 00	
Enfield.....	561.57		121.84	3,647.80	215.00	78.66	144.99	8.00	99.50
Franconia.....	53.70	58.82	104.99	1,367.00	360.00		35.00		395.00
Grafton.....	28.73		22.64	1,552.95		113.00	65.00	14.75	36.00
Groton.....	32.68		5.60	523.34			20.25	5 00	
Hanover, town.....	58.40		31.95	1,315.00	200.00	282.29	142.50	12.00	266.75
Hanover, special.....	367.00	22 99	293.63	3,697.00			120.00		
Haverhill, town.....	350.00	75.00	354 35	4,454.32					50.00
Haverhill*.....	399.54	80.68	146.82	4,453.00			37.53	9.75	
Hebron.....	17.73		24.23	420.00		80.00	15.22	3 00	
Holderness.....	13.00		64 32	1,081.52		261.00	50.00	30.00	73.20
Landaff.....	145.50		69.00	996.75		48.00	36.50	4.00	
Lebanon, town.....	250.09		146.18	2,931.15	583.33	633.00	155.00	10.00	131.58
Lebanon, special.....	881.38	496.83	395.37	8,604.56	827.45		125.00		
Lebanon, West.....	300.00	48.45		1,857.17			75.00	10.00	
Lincoln.....	102.22		33.61	1,280.00		386.00	18.00	25.00	35.00
Lisbon, town.....			10.00	1,017.00		475.00	79 50		112.50
Lisbon, special.....	250.00	150.00	109.21	4,679.43			25.00	10.00	
Lisbon †.....	10.00		6.80	256.00		122.00	1.00		
Littleton.....	637.70	73.44	479.28	10,786.80	1,440.00		79.59	39.50	664.00
Lyman.....			65.00	871.50		46 00	42.00		37.00
Lyme.....	175.25	4.40	62.20	2,464.13		48.00	105.00	9.85	
Monroe.....	100.80		21.00	860.00		10.00	69.00	6.75	225.50
Orange.....	21.78		4.34	357.00			23.00	3 00	36.50
Orford.....	116.98			1,818.50	350.00	107.66	73.85	10.00	597.48
Piermont.....	37.20		82.17	1,226.30	250.00	77.00	60.00		373.45
Plymouth.....	363.10	119.09	771.05	8,463.00			170.00	15.00	50.50
Rumney.....	70.85	7.50	64.55	1,500.50		602.00	100.00	8.50	218.00
Thornton.....	27.56		61.97	1,166.50			38.50	8.00	63.00
Warren.....	211.10		61.28	1,860.00	500.00	143.00	75.00	22.82	63.00
Waterville †.....									
Wentworth.....	40.00	10.00	10.00	1,442.00		218 39	88.00	10.00	100.00
Woodstock.....	49.71		18.66	1,119.30		398.00	35.00		52 00
Total.....	\$6,871.95	\$1,276.70	\$4,166.10	\$97,564.02	\$4,850.78	\$6,638.48	\$2,910.58	\$527.92	\$4,261.76

\* Woodsville district.

† Sugar Hill district.

‡ No schools.



## GRAFTON COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	\$ Rate of school assessment.	Average of current expenditure per pupil.
\$4.00			\$45.00	\$40.00	\$1,587.21			\$37.18	\$1,624.39	\$3.88	\$17.83
			12.00		385.08				385.08	9.50	16.74
		\$262.50	220.00	41.61	3,722.05			200.00	3,922.05	6.01	14.94
		40.00	105.25		2,051.15				2,051.15	5.51	23.31
5.00		36.00	75.00	10.80	1,138.57		\$310.00	35.00	1,483.57	7.23	28.46
			24.00	14.92	613.95				613.95	3.65	15.35
202.32		55.00	142.29	9.86	2,610.98				2,610.98	5.77	26.92
8.00	\$26.00	175.00	225.00		3,334.00			350.00	3,684.00	7.29	43.30
			13.50	28.56	620.41				620.41	3.15	23.86
			40.00	58.20	794.48			14.75	809.23	5.23	17.66
273.38		252.37	162.95	103.78	3,870.15				3,870.15	5.29	23.32
35.00	15.00	10.00	100.00	20.00	2,591.40			75.00	2,666.40	4.77	23.56
1.00		15.98	71.31	79.11	2,660.41				2,660.41	5.30	15.29
		72.00	60.00		1,542.00				1,542.00	4.97	19.28
55.23		12.00	11.75	24.90	708.39				708.39	3.15	11.07
10.68		13.70	11.07	8.75	548.31				548.31	4.32	15.23
			8.00	2.00	189.00				189.00	2.81	11.81
22.77		102.55	294.70	90.62	5,388.00		42.89	293.32	5,724.21	5.92	20.49
		98.97	108.68	46.64	2,628.80			18.00	2,646.80	4.03	31.30
5.75		10.75	55.35	12.50	1,922.42			120.25	2,042.67	4.45	17.80
			18.00		604.87				604.87	4.94	13.15
182.31		13.05	43.00	182.30	2,729.55				2,729.55	7.65	26.24
187.85		245.78	237.49	91.35	5,363.09			361.00	5,724.09	4.30	23.12
	198.00	200.00	400.00	352.40	6,434.07			162.91	6,596.98	5.64	19.38
8.98		344.75	448.10	326.61	6,255.76	\$1,000.00	580.00		7,835.76	9.73	20.12
			14.00		574.18				574.18	4.45	17.40
79.44			25.50	70.60	1,748.58			200.00	1,948.58	3.81	22.71
5.00		28.25	36.27		1,369.27			30.00	1,399.27	2.82	18.26
81.10	122.50	37.66	311.89	15.65	5,409.13	7,100.10		247.27	12,756.50	7.52	18.85
25.20		1,009.55	1,099.60	534.20	13,999.14		1,413.18	864.82	16,277.14	7.42	27.03
12.20		287.00	291.34	519.52	3,400.68		45.24	11.73	3,457.65	6.43	25.20
10.20		134.50	218.93	6.15	2,249.70			95.21	2,344.91	3.70	20.09
52.13		42.95	97.50	13.00	1,899.58				1,899.58	4.74	21.57
		325.00	265.29	258.36	6,072.29		786.77		6,859.06	8.60	24.79
	10.00	10.00	28.50	15.00	459.30				459.30	3.50	28.71
117.70	368.62	1,327.51	1,139.29	309.66	17,463.09		590.48	1,514.69	19,568.26	8.87	23.60
		22.50	63.50		1,147.50			200.00	1,347.50	3.82	15.30
	34.00	45.06	52.57	65.03	3,065.49	3,227.71	124.00	38.80	6,456.00	4.62	21.59
15.80		41.35	51.62	14.93	1,416.75			260.00	1,676.75	3.23	15.92
4.61			14.67	18.25	483.15			18.97	502.12	4.73	9.66
31.34		162.50	190.85	87.10	3,546.26				3,546.26	3.22	20.75
14.61		24.50	84.00	195.98	2,425.21				2,425.21	4.44	25.53
113.72	20.87	561.00	829.56	614.37	12,091.26	2,100.00	1,271.11		15,462.37	11.04	28.79
13.10		17.50	145.25	85.63	2,833.38				2,833.38	4.53	21.46
17.20		66.75	42.75	14.75	1,506.98			20.70	1,527.68	5.11	19.08
76.10	50.00	69.20	91.00	112.14	3,334.64	2,989.38			6,324.02	4.38	27.11
		20.00	66.00		2,004.39				2,004.39	5.71	20.88
31.88	31.20	77.73	64.73	43.00	1,921.21				1,921.21	2.49	16.56
\$1,703.69	\$876.19	\$6,370.91	\$8,157.95	\$4,538.23	\$150,715.26	\$16,417.19	\$5,163.67	\$5,169.60	\$177,465.72	\$4.97	\$21.97

\$ On one thousand dollars of inventoried valuation.



TABLE No. I.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1907.)

SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Amherst .....	10	10	6	.....	32	30	31.50
Antrim .....	9	7	3	.....	32	31	31.30
Bedford .....	9	.....	2	1	30	30	30.00
Bennington .....	4	3	.....	1	33	24	30.75
Brookline .....	4	1	.....	.....	32	31	31.75
Deering .....	6	.....	4	2	24	24	24.00
Francestown .....	5	2	.....	.....	30	30	30.00
Goffstown, town district .....	10	2	2	5	32	21	30.63
Goffstown, special district .....	4	.....	4	.....	36	36	36.00
Greenfield .....	5	.....	2	.....	34	*12	29.50
Greenville .....	4	4	.....	.....	36	36	36.00
Hancock .....	6	2	1	1	33	24	28.43
Hillsborough, town district .....	11	.....	4	5	34	27	30.00
Hillsborough Bridge, special .....	7	7	.....	.....	36	33	35.14
Hollis .....	7	3	4	.....	33	*14	31.00
Hudson .....	8	8	1	.....	34	30	31.60
Litchfield .....	3	.....	1	1	33	33	33.00
Lyndeborough .....	6	.....	3	.....	33	22	29.50
Manchester .....	126	121	1	.....	38	38	38.00
Mason .....	5	.....	2	.....	36	36	36.00
Merrimack .....	9	4	3	.....	36	36	36.00
Milford .....	17	12	1	.....	36	35	35.82
Mont Vernon .....	4	.....	3	1	32	*8	31.00
Nashua .....	76	69	3	.....	36	36	36.00
New Boston .....	9	2	5	1	30	20	28.77
New Ipswich .....	5	2	.....	.....	36	*10	36.00
Pelham .....	5	.....	.....	.....	33	33	33.00
Peterborough .....	12	12	1	.....	36	33	33.50
Sharon .....	2	.....	2	.....	20	*12	20.00
Temple .....	2	1	1	.....	32	31	31.50
Weare .....	13	.....	3	.....	33	*8	28.63
Wilton .....	11	11	3	.....	37	31	34.27
Windsor .....	1	.....	.....	1	12	12	12.00
Total .....	405	283	65	19	.....	.....	34.97

\* Scholars conveyed.

† No children living in town for second term.



TABLE No. II.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Amherst.....	10	.....	.....	13	\$15,000.00	\$500.00
Antrim.....	7	.....	.....	12	15,000.00	150.00
Bedford.....	10	.....	.....	10	5,000.00	500.00
Bennington.....	3	.....	.....	4	3,500.00	150.00
Brookline.....	4	.....	.....	4	3,500.00	200.00
Deering.....	9	.....	.....	9	3,000.00	150.00
Francestown.....	6	1	.....	7	4,000.00	190.00
Goffstown, town district...	10	.....	.....	11	6,000.00	160.00
Goffstown, special district	1	.....	.....	8	12,300.00	300.00
Greenfield.....	4	.....	.....	5	6,000.00	300.00
Greenville.....	3	.....	.....	6	12,000.00	400.00
Hancock.....	8	.....	.....	9	5,000.00	200.00
Hillsborough, town.....	16	1	.....	16	10,000.00	800.00
Hillsboro' Bridge, special.	1	.....	.....	8	25,600.00	500.00
Hollis.....	8	.....	.....	11	13,000.00	500.00
Hudson.....	7	1	.....	11	15,000.00	300.00
Litchfield.....	4	1	.....	4	1,000.00	60.00
Lyndeborough.....	7	.....	.....	7	2,600.00	60.00
Manchester.....	26	.....	.....	149	801,031.00	37,049.00
Mason.....	6	.....	.....	6	3,000.00	368.00
Merrimack.....	10	1	.....	12	12,950.00	300.00
Milford.....	10	.....	.....	24	50,000.00	700.00
Mont Vernon.....	4	.....	.....	5	3,500.00	500.00
Nashua.....	20	.....	.....	98	397,433.00	32,000.00
New Boston.....	11	2	.....	13	11,000.00	350.00
New Ipswich.....	6	.....	.....	7	4,500.00	250.00
Pelham.....	5	.....	.....	5	5,932.00	1,200.00
Peterborough.....	7	.....	.....	15	25,000.00	1,500.00
Sharon.....	2	.....	.....	2	600.00	15.00
Temple.....	6	1	.....	6	3,000.00	.....
Weare.....	15	.....	.....	17	10,400.00	250.00
Wilton.....	7	.....	.....	13	45,000.00	500.00
Windsor.....	1	.....	.....	1	350.00	50.00
Total.....	254	8	.....	528	\$1,530,596.00	\$80,452.00

TABLE No. III.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant officers' enu- meration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tu- ition paid by town.	Pupils attending academy, tuition paid by town.	Average mem- ber- ship.	Average daily at- tendance.	Per cent. of attend- ance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Amherst.....	79	72	120	107	3	205	19		3		190	170	89		2
Antrim.....	97	110	116	129	1	223	21	3			207	192	93		
Bedford.....	109	96	92	80	1	169	2			5	155	138	89	6	
Bennington.....	42	54	60	66		126			5		67	62	92		
Brookline.....	55	50	49	42	2	88	1		4		72	60	83		
Deering.....	26	24	32	30	3	59			2		47	44	93		
Francesstown.....	57	58	55	54	1	107	1			1	84	74	88	1	23
Goffstown.....	75	57	96	77	2	165	6		10	1	132	113	86	8	
Goffstown†.....	77	96	85	101		168	18	13			185	181	97		
Greenfield.....	56	46	43	60	3	100			8		103	90	87		
Greenville.....	181	193	59	60	2	116	1			6	96	88	91	275	
Hancock.....	57	32	67	49	4	112			5		89	74	83		
Hillsborough †.....	62	53	51	51	1	98	3		9		85	77	90		1
Hillsboro' Bridge †.....	103	96	133	128	1	243	17	13			233	216	92		
Hollis.....	100	65	90	72		150	12				153	143	93		
Hudson.....	114	128	111	110	3	217	1		22	1	184	158	86		
Litchfield.....	21	22	17	23		39	1		4		24	22	91		
Lyndeborough.....	50	44	69	56		122	3		7		88	73	82		
Manchester.....	5,707	5,871	2,978	2,892	62	5,490	318	35			4,995	4,589	92	5,000	35
Mason.....	45	37	51	55	3	103					73	63	87		
Merrimack.....	58	69	73	75	5	140	3			24	121	105	87		
Milford.....	347	307	443	388	2	717	112	31			743	693	93		
Mont Vernon.....	21	30	30	35	2	63			5	5	41	40	97		
Nashua.....	1,865	2,006	1,514	1,502		2,775	241	44			2,564	2,376	93	2,000	
New Boston.....	80	115	96	93	3	176	10	1			140	120	86		1
New Ipswich.....	96	74	66	67	1	132				7	118	103	87		25
Pelham.....	64	59	75	68		143			14	1	109	97	88		2
Peterborough.....	193	201	191	190	3	342	36	8			349	313	89		
Sharon.....	7	7	8	6		14					13	12	91		
Temple.....	16	17	22	19		38	3			5	31	28	90		
Weare.....	103	105	121	133	5	247	2		5		189	159	84		
Wilton.....	162	166	174	185	5	335	19	9			324	290	89		2
Windsor.....	1	5	2	4		6					6	5	92		
Total.....	10,126	10,365	7,189	7,007	118	13,228	850	157	102	56	12,010	10,968	91	7,320	61

\* Between five and sixteen inclusive.

† Town district.

‡ Special district.

TABLE No. IV.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Amherst.....			14	\$30.40	2	2	1	2	...
Antrim.....			13	32.67			5	4	...
Bedford.....			15	30.00	2	6		1	...
Bennington.....			4	32.00			1	1	...
Brookline.....			6	33.00				1	...
Deering.....			8	28.00	2				...
Francetown.....			7	26.57			1	1	...
Goffstown, town dist....			17	28.73			3	1	...
Goffstown, spec. dist....			4	40.00			4	2	...
Greenfield.....			5	31.50	3				...
Greenville.....			4	37.00		1	1		...
Hancock.....	1	\$28.00	11	34.00	2	1	1		...
Hillsborough, town.....			17	26.18	4	9	2		...
Hillsboro' Bridge, spec.			8	38.86		1	2	1	1
Hollis.....	1	80.00	7	39.86	1		1		1
Hudson.....			8	32.00				3	...
Litchfield.....			7	31.33	2		1	1	...
Lyndeborough.....			11	31.66	5				...
Manchester.....	12	127.92	128	60.17	8		20	89	4
Mason.....			5	33.60		1	1		...
Merrimack.....			9	31.11			2		...
Milford.....			19	40.69			6	1	...
Mont Vernon.....			7	29.00	2			1	...
Nashua.....	1	128.00	78	51.23	3		10	52	1
New Boston.....			15	29.77	3		3		...
New Ipswich.....			6	36.80			4		...
Pelham.....			8	32.00	3		1	2	1
Peterborough.....			12	34.88	3		6		...
Sharon.....			2	24.00	1	1			...
Temple.....			4	32.00			2	1	...
Weare.....	1	44.00	12	32.11	3	8	1		...
Wilton.....			11	35.45	3		3	1	1
Windsor.....			1	24.00					...
Total.....	16	\$113.44	483	\$42.69	53	30	82	165	9

TABLE No. V.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Amherst .....	\$2,100.00	\$1,700.00		\$114.68	\$619.88			\$247.40	\$64.34	\$4,846.30
Antrim .....	2,445.00	2,862.00	\$250.00	165.92	55.00		\$471.11	182.30	240.96	6,672.29
Bedford .....	2,430.09	305.00	289.03	112.85				251.86	37.50	3,426.24
Bennington .....	750.00	825.00		67.10				162.18		1,804.28
Brookline .....	727.50	300.00	75.00	65.27				81.60		1,249.37
Deering .....	600.00	100.00		37.40	141.67			184.18	131.49	1,284.74
Francetown .....	1,125.00	350.00	112.90	62.83				122.31	32.75	1,805.79
Goffstown, town ..	2,556.66		236.00	111.78				150.53	17.00	3,071.97
Goffstown, spec. ..	2,438.34	1,000.00	440.78	106.60				143.57	208.85	4,338.14
Greenfield .....	892.50	457.50		67.10				67.00	8.50	1,492.60
Hancock .....	2,085.00	215.00		67.65				126.98	122.00	2,616.63
Hillsboro', town ..	1,185.00	715.00	150.00	72.59				94.30	8.75	2,225.64
Hillsboro', Br. * ..	1,276.96	1,550.00	223.71	71.35		\$60.54		113.40	10.50	3,306.46
Hollis .....	3,163.04	1,000.00	608.42	173.26			250.00	281.20	226.28	5,702.20
Hudson .....	1,620.00	1,080.00	135.70	111.63	462.00			165.00		3,574.33
Litchfield .....	2,357.50	1,550.00	255.41	145.18		63.62		142.35	5.50	4,719.56
Lyndeborough .....	847.50	175.00		26.84				51.97		1,101.31
Manchester .....	787.50	307.48	146.73	61.60	31.02		102.93	128.40	4.80	1,570.46
Mason .....	119,325.00	24,251.71		3,348.29					3,670.00	150,595.00
Merrimack .....	682.50	1.00		49.41	666.53			124.20	160.50	1,684.14
Milford .....	2,527.50	300.00		113.46	543.81			114.60		3,599.37
Mont Vernon .....	6,452.50	6,547.50		456.28			350.00	373.17	2,685.04	16,864.49
Nashua .....	787.50	212.50		36.60						1,036.60
New Boston .....	43,620.00	23,626.86	8,113.81	1,806.82				1,556.90	1,235.30	79,959.69
New Ipswich .....	2,482.50	317.50		108.58	700.00			200.32	24.00	3,832.90
Pelham .....	1,777.50	22.50		82.96	445.07			122.48	634.23	3,084.74
Peterborough .....	1,290.00	550.00	120.00	88.45				215.16		2,263.61
Sharon .....	5,310.00	1,240.00	500.00	221.43				364.15	347.13	7,982.71
Temple .....	165.00	135.00	12.00					13.00		325.00
Weare .....	517.50	82.85	35.00	27.40				64.60		727.35
Wilton .....	2,940.00	400.00	429.87	149.45	147.26			204.15	53.60	4,324.33
Windsor .....	3,270.00	2,730.00		221.00	458.00		250.00	333.81	253.22	7,516.03
	75.00	25.00		3.05				7.20		110.25
Total .....	\$220,900.00	\$74,934.40	\$12,134.36	\$8,354.81	\$4,270.24	\$124.16	\$1,424.04	\$6,390.27	\$10,182.24	\$338,714.52

\* Special district.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Amherst .....	\$430.02	\$8 00	\$120.06	\$3,245.11	\$175.00				\$257.00
Antrim .....	318.29		79.06	3,482.40	300.00		\$180.00	\$5.00	296.00
Bedford .....	248.21	34.70	34.82	1,980.25		\$538.85	147.00		212.00
Bennington .....	39.23		33.69	1,024.00		168.00	32.00	5.00	25.50
Brookline .....	64.07		15.81	1,048.00		120.00	60.00	9.00	
Deering .....	55.54		30.81	936.10		30.00	97.91	5.00	35.00
Francestown .....	60.50		52.40	934.50		329.33	83.00		187.50
Goffstown, town .....	125.00	46.00	65.00	2,388.50		214.50	79.15	5.00	5.50
Goffstown, special .....	440.78	12.00	143.00	2,791.27			46.00	3.00	
Greenfield .....	50.00	50.00	23.45	1,133.00			60.00		
Greenville .....	71.23	10.83	40.42	1,338.00		307.00	60.00	17.54	202.50
Hancock .....	49.73		64.43	1,273.00		239.00	98.00	6.00	83.00
Hillsborough, town .....	113.00	90.00	20.71	2,040.50		148.50	180.00		206.00
Hillsborough, spec. .....	349.52	33.70	225.20	3,871.64	500.00		75.00	5.00	
Hollis .....	48.00	30.00	138.13	1,637.00			120.00	3.00	265.50
Hudson .....	155.32		173.83	2,159.50		920.00	125.00		499.15
Litchfield .....			29.45	734.60		133.00	25.00		
Lyndeborough .....	81.80	24.00	41.93	1,302.50		117.50	100.90	3.00	6.00
Manchester .....	5,101.94	250.00	1,783.98	99,473.35	2,300.00		220.00	1,000.00	38.00
Mason .....	81.95			1,310.00			75.00	3.00	213.00
Merrimack .....	295.76	25.00	190.13	2,479.25		864.00	165.00		253.00
Milford .....	885.63		471.93	10,700.66	700.00		200.00		39.00
Mont Vernon .....	27.87	27.88	27.93	755.00		360.00	50.00		100.25
Nashua .....	3,477.91	741.21	3,894.69	48,795.48	2,000.00		100.00	900.00	260.00
New Boston .....	149.54	15.60	144.57	2,888.42			160.00	3.00	311.80
New Ipswich .....	198.80	15.45	65.75	1,377.50		100.00	100.00	5.50	426.80
Pelham .....	88.53		13.88	1,312.00		560.00	55.00		79.00
Peterborough .....	255.86	40.00	310.55	5,665.00					66.40
Sharon .....	6.00		10.00	168.00			8.00		66.00
Temple .....	15.78		8.30	503.00		104.00	30.00		70.00
Weare .....	312.02	30.00	65.50	2,943.00		110.77	129.75	14.00	89.00
Wilton .....	381.95	5.00	95.00	4,618.00	500.00		160.00	10.00	280.25
Windsor .....				72.00			8.00		
Total .....	\$13,979.78	\$1,489.37	\$8,414.41	\$216,380.53	\$6,475.00	\$5,364.45	\$3,029.71	\$2,002.04	\$4,573.75



## HILLSBOROUGH COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$172.57		\$212.50	\$291.89	\$197.61	\$5,109.76				\$5,109.76	\$6.60	\$26.89
194.87		160.05	418.94	168.16	5,602.77				6,403.77	8.80	27.07
57.94		34.00	118.05	57.94	3,463.76			\$801.00	3,463.76	3.62	20.49
20.21	\$30.00	60.50	97.26	46.45	1,581.84			36.62	1,618.46	5.68	23.61
		41.55	32.75	17.13	1,403.31			50.94	1,450.25	2.99	19.55
		20.00	55.50	18.95	1,284.81				1,284.81	3.74	27.34
5.60		39.55	50.45		1,742.83			143.86	1,886.69	4.57	20.75
161.12		30.15	118.32	1.00	3,239.24				3,239.24	3.97	22.65
25.00		245.34	237.87	170.00	4,114.26		\$60.00		4,174.26	5.58	22.24
		40.00	41.50	185.09	1,583.04			200.00	1,783.04	5.33	15.08
	50.00	131.80	208.16	14.48	2,451.96	\$500.00	255.00	279.94	3,486.90	3.47	25.54
		30.00	55.00	6.50	1,904.66			117.62	2,022.28	5.63	21.40
10.00	6.00	66.00	66.50	31.89	2,979.70			87.36	3,067.06	7.05	31.69
179.56		246.00	254.79	161.56	5,901.97				5,901.97	4.97	25.33
20.04		151.50	135.64	43.90	2,592.71		118.00		2,710.71	4.61	16.94
45.61		191.00	166.25	76.33	4,511.99				4,511.99	3.59	21.79
	20.00	18.75	24.50	21.30	1,006.60			15.68	1,022.28	4.84	35.95
15.00		44.50	74.95	35.30	1,847.38	405.00		75.00	2,327.38	4.52	20.99
11,714.45		7,363.43	9,465.87	7,800.82	146,511.84			2,758.12	149,269.96	3.99	29.33
		46.00	72.50	47.21	1,848.66				1,848.66	2.86	25.32
		155.00	169.50	64.45	4,661.09			250.00	4,911.09	4.07	32.15
		1,025.17	570.00	836.82	15,429.21		600.00	1,155.25	17,184.46	8.40	20.49
29.39		24.05	34.75		1,437.12			78.21	1,515.33	2.73	28.18
2,181.00		7,535.42	5,714.32	580.49	76,180.52			5,039.17	81,219.69	4.87	29.71
92.71	25.00	97.25	171.47	140.03	4,199.39				4,199.39	4.31	30.00
122.52		47.55	62.00	27.45	2,549.32				2,549.32	3.51	21.60
3.00		24.00	120.67	1.80	2,257.88			100.00	2,357.88	4.00	18.20
	50.00	385.25	479.36	629.31	7,881.73			451.51	8,333.24	4.57	22.57
					258.00				258.00	2.93	19.85
		16.25	18.40	12.84	778.57			225.00	1,003.57	3.46	21.63
217.98		88.90	158.43	176.67	4,336.02			130.67	4,466.69	5.01	22.94
		505.25	388.73	231.47	7,175.65				7,175.65	6.79	22.15
				3.75	83.75				83.75	2.22	13.86
\$15,268.57	\$181.00	\$19,076.71	\$19,874.32	\$11,806.70	\$327,916.34	\$905.00	\$1,033.00	\$11,995.95	\$341,850.29	\$4.64	\$26.95

\* On one thousand dollars of inventoried valuation.





TABLE No. I.—MERRIMACK COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Allenstown .....	3	3	1	.....	36	36	36.00
Andover .....	10	4	2	.....	36	30	31.90
Boscawen, town district .....	4	4	1	1	36	30	31.50
Boscawen, special district .....	4	4	.....	.....	36	35	35.75
Bow .....	7	.....	5	1	30	30	30.00
Bradford .....	8	2	2	1	30	27	28.12
Canterbury .....	7	.....	3	.....	32	28	30.00
Chichester .....	6	.....	1	.....	31	31	31.00
Concord, town district .....	11	.....	2	1	34	31	33.72
Concord, Union district .....	59	59	.....	.....	38	38	38.00
Concord, Penacook district .....	8	7	.....	.....	36	36	36.00
Danbury .....	6	.....	3	.....	27	*12	25.46
Dumbarton .....	4	.....	.....	.....	36	31	34.75
Epsom .....	6	.....	6	1	32	29	31.00
Franklin .....	19	15	1	2	36	*17	35.68
Henniker .....	9	3	1	1	35	29	31.00
Hill .....	5	2	1	1	34	31	32.80
Hooksett .....	9	1	2	1	33	33	33.00
Hopkinton .....	7	4	1	.....	29	27	28.57
London .....	9	2	4	3	35	30	32.77
Newbury .....	6	.....	3	3	27	26	26.83
New London .....	5	5	.....	1	30	28	28.40
Northfield .....	5	.....	.....	1	27	24	25.80
Pembroke .....	9	9	1	.....	36	35	35.88
Pittsfield .....	10	10	2	1	36	33	34.00
Salisbury .....	6	.....	1	4	26	26	26.00
Sutton .....	9	6	4	1	31	20	28.74
Warner .....	12	3	2	4	30	23	28.66
Webster .....	6	.....	1	2	30	20	26.33
Wilmot .....	6	.....	4	.....	23	23	23.00
Total .....	275	139	55	30	.....	.....	33.80

\* Scholars conveyed.

TABLE No. II.—MERRIMACK COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings furniture and sites.	Estimated value of apparatus.
Allenstown.....	2			5	\$9,000 00	\$100 00
Andover.....	10			12	6,500 00	350.00
Boscawen, town district	6			7	4,500.00	75.00
Boscawen, special dist...	1			8	11,000.00	1,000.00
Bow.....	8			4	5,600.00	200.00
Bradford.....	9	2		10	3,000.00	250.00
Canterbury.....	9			9	5,500.00	100.00
Chichester.....	7			7	3,100.00	100.00
Concord, town district ..	12			12	11,000.00	250.00
Concord, Union district.	18		2	84	540,500.00	7,000.00
Concord, Penacook dist..	3			11	19,000.00	550.00
Danbury.....	8			8	5,000.00	60.00
Dunbarton.....	7	2		7	2,500.00	100.00
Epsom.....	7			7	6,000.00	500.00
Franklin.....	10			27	78,500.00	1,300.00
Henniker.....	10	1		15	15,000.00	560.00
Hill.....	4			5	1,800.00	75.00
Hooksett.....	8			9	12,600.00	2,500.00
Hopkinton.....	14			17	13,000.00	400.00
Loudon.....	8			9	7,000.00	400.00
Newbury.....	7	2		7	2,800.00	75.00
New London.....	6		1	8	8,500.00	200.00
Northfield.....	8			8	4,000.00	300.00
Pembroke.....	10			10	8,500.00	500.00
Pittsfield.....	8			12	21,200.00	350.00
Salisbury.....	7			7	3,700.00	80.00
Sutton.....	9			10	4,000.00	450.00
Warner.....	15	1		17	3,500.00	350.00
Webster.....	7			7	3,500.00	75.00
Wilnot.....	7			7	2,000.00	.....
Total.....	242	8	3	366	\$821,800.00	\$18,250.00

TABLE No. III.—MERRIMACK COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant off- icers' enu- meration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high schools.	Pupils attending high school, tu- ition paid by town.	Pupils attending academy, tuition paid by town.	Average member- ship.	Average daily at- tendance.	Per cent. of attend- ance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Allenstown .....	178	128	57	31	...	88	...	...	2	7	63	56	88	136	...
Andover .....	102	117	159	140	3	253	43	...	44	...	229	182	79	...	...
Boscawen, town..	45	49	39	45	...	83	1	...	2	1	66	60	90	...	...
Boscawen, special	75	68	70	63	...	133	...	...	7	1	116	107	92	...	...
Bow .....	55	52	48	60	3	103	2	...	7	...	98	87	88	...	...
Bradford .....	65	62	57	74	2	127	2	...	9	4	104	92	88	...	...
Canterbury .....	59	62	70	63	4	125	4	...	4	5	103	88	81	...	11
Chichester .....	31	42	48	39	3	80	4	...	...	4	77	69	90	...	...
Concord, town....	149	124	114	97	3	208	...	...	7	...	193	157	81	1	39
Concord, Union...	1,431	1,472	1,521	1,597	224	2,603	291	41	...	...	2,645	2,397	90	616	32
Concord† .....	166	180	189	186	...	354	21	9	7	...	320	296	92	...	...
Danbury .....	62	61	61	56	...	116	1	...	1	10	105	94	90	...	...
Dunbarton .....	32	43	37	46	2	80	1	...	9	...	63	54	86	...	...
Epsom .....	77	44	76	41	4	111	2	...	4	14	99	86	87	2	...
Franklin .....	574	573	408	422	25	724	81	19	...	...	724	672	92	450	96
Henniker .....	98	78	116	101	5	195	17	...	...	...	182	165	90	...	...
Hill .....	52	49	55	49	...	102	2	...	11	1	81	74	91	...	...
Hooksett .....	165	149	107	89	6	186	4	...	9	7	196	170	86	88	2
Hopkinton .....	121	118	126	135	2	239	20	1	...	...	220	196	89	...	...
Loudon .....	62	64	61	68	2	125	2	...	4	...	109	95	87	3	1
Newbury .....	43	41	40	43	...	83	...	...	3	...	56	43	77	...	...
New London.....	66	47	63	57	2	117	1	...	...	29	101	90	90	...	...
Northfield .....	63	42	58	42	2	96	2	...	...	...	74	71	96	...	...
Pembroke .....	302	287	142	133	...	275	...	...	3	19	209	185	88	204	...
Pittsfield .....	170	184	215	214	...	390	39	17	...	...	402	358	89	...	5
Salisbury .....	33	34	36	34	5	65	...	...	2	8	35	30	85	...	...
Sutton .....	50	41	56	50	3	100	3	...	5	11	82	77	94	...	...
Warner .....	100	84	139	123	2	205	55	26	...	...	229	200	87	...	3
Webster .....	36	35	34	36	2	65	3	...	2	...	53	44	83	...	1
Wilmot .....	55	40	78	49	1	123	3	...	...	...	83	74	89	...	...
Total .....	4,517	4,370	4,280	4,183	305	7,554	604	113	98	165	7,117	6,369	89	1,500	190

\* Between five and sixteen inclusive.

† Penacook district.

TABLE No. IV.—MERRIMACK COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Allentown.....			3	\$48.00		1			
Andover.....			16	26.68	2	3	2		1
Boscawen, town.....			6	29.16	1	1	1		
Boscawen, special.....			6	42.00			1	1	1
Bow.....	1	\$28.00	6	30.00	2		1	1	
Bradford.....			8	29.00		3			
Canterbury.....	1	30.00	12	28.00	3	4	1		
Chichester.....			8	30.00	2		1		
Concord, town.....			11	33.03	2	10		1	1
Concord, Union.....			71	48.96	12	13	9	52	
Concord, Penacook.....			9	38.50	1		5	2	1
Danbury.....	3	36.50	8	27.21	2				
Dunbarton.....			5	33.33	1			1	
Epsom.....			12	29.22	3	3			
Franklin.....			20	40.80	2	1	8	2	
Henniker.....			10	31.00	1	1	2		
Hill.....			7	28.90	1	1	1	2	
Hooksett.....			16	35.11	1		2	1	1
Hopkinton.....			7	33.42	2	2	2	1	
Loudon.....	1	48.00	9	32.00		1	1	2	1
Newbury.....			6	24.66	4	5			
New London.....			5	32.00					
Northfield.....			5	27.00	1	3		1	
Pembroke.....			11	34.66		3	2		
Pittsfield.....	1	32.00	13	35.00	1	1	5		1
Salisbury.....			8	27.25	2	3			
Sutton.....	1	26.00	11	27.00	2	3		4	
Warner.....	1	28.00	18	29.00	3		1	1	
Webster.....			9	27.00	1		1		
Wilnot.....	1	32.00	6	28.00	1	3	1	1	1
Total.....	10	\$33.35	342	\$35.22	43	65	47	73	8

TABLE No. V.—MERRIMACK COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Allenstown .....	\$2,032.50	\$300.00		\$74.42			\$100.00	\$119.40	\$20.20	\$2,646.52
Andover .....	1,845.00	1,350.00	\$93.46	178.73				218.60	66.20	3,751.99
Boscawen, town	829.46	235.00	75.00	59.23	\$195.00	\$111.60		60.96		1,566.25
Boscawen, spec.	1,443.04	250.00		103.03			75.00	106.04		1,977.11
Bow .....	1,447.50		120.64	70.76				140.20	42.20	1,827.30
Bradford .....	1,807.50			102.48			233.33	144.00	17.60	2,304.91
Canterbury .....	1,777.50			82.35		29.37			37.00	1,926.22
Chichester .....	1,290.00	500.00		59.78				86.40	31.00	1,967.18
Concord, town.	3,616.62	500.00	247.25	140.30	2.47	118.19		131.07	76.20	4,832.10
Concord, Union	44,534.68	29,165.00	3,044.66	1,722.64	30.45			1,613.94	3,317.24	83,428.70
Concord *	3,043.70	3,501.79	208.00	225.70	2.08	468.28		110.30	247.16	7,807.10
Danbury .....	1,020.00	100.00		87.84		33.78	298.88		24.34	1,564.84
Dunbarton .....	1,327.50		112.47	55.51				114.33		1,609.81
Epsom .....	1,365.00	300.00	118.30	78.69		31.25		97.86		1,991.10
Franklin .....	11,190.00	7,809.80		475.80				524.40	539.20	20,539.20
Henniker .....	2,797.50	952.50		128.10			250.00	229.10	50.00	4,407.20
Hill .....	690.00	100.00		69.54		85.80	286.47	6.10	63.20	1,301.61
Hooksett .....	2,700.00	150.00		125.05				292.20		3,197.25
Hopkinton .....	3,630.00	700.00		167.75				246.77	46.95	4,791.47
Loudon .....	2,220.00		243.28	85.40	94.00			187.40		2,830.08
Newbury .....	1,192.50	107.50	75.29	52.46				12.80	32.72	1,473.27
New London .....	1,620.00	451.00		80.52			187.50	115.80	2,610.00	5,064.82
Northfield† .....	871.78			66.49				75.38		2,211.87
Pembroke .....	4,567.50			175.68			250.00	59.45	248.00	5,300.63
Pittsfield .....	4,125.00	2,375.00	250.00	264.74			250.00	118.35	464.33	7,847.42
Salisbury .....	982.50	200.00		42.90		26.11		98.60		1,349.21
Sutton .....	1,170.00	750.00	150.00	90.25	97.50	31.00		130.87	172.43	2,592.08
Warner .....	2,865.00	500.00		137.25			233.33	168.17	362.21	4,265.96
Webster .....	1,260.00			54.90				91.40		1,406.30
Wilmet .....	900.00	300.00		61.00		75.00		92.00	77.00	1,505.00
Total .....	\$111,360.00	\$50,597.68	\$4,738.44	\$5,118.42	\$421.50	\$1,010.38	\$2,164.51	\$5,328.39	\$8,545.18	\$189,684.50

\* Penacook district.

† The greater part of Northfield is included in Tilton Union district.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Allenstown .....	\$42.05	\$24.00	\$13.00	\$1,145.00	\$175.84	\$366.08	\$19.80	.....	\$110.00
Andover .....	44.09	.....	49.37	2,130.90	.....	1,261.00	90.00	\$18.00	.....
Boscawen, town .....	16.14	24.00	47.49	938.90	.....	120.00	60.00	5.00	219.60
Boscawen, special .....	160.47	18.00	75.07	1,512.00	150.00	325.00	30.00	25.00	.....
Bow .....	89.09	.....	31.55	1,553.00	.....	.....	80.00	.....	4.00
Bradford .....	150.00	25.00	54.10	1,733.00	466.06	555.00	.....	6.00	186.35
Canterbury .....	70.50	.....	13.00	1,420.00	.....	356.69	61.50	13.00	75.00
Chichester .....	78.54	.....	22.57	1,455.00	.....	196.00	90.00	9.00	.....
Concord, town .....	114.61	.....	89.45	2,917.25	.....	408.46	200.00	1.00	130.00
Concord, Union .....	2,587.86	104.40	958.61	49,848.17	2,000.00	.....	250.00	575.00	335.00
Concord, Penacook .....	494.31	12.90	89.50	3,675.42	399.30	361.04	25.00	*	.....
Danbury .....	138.91	32.00	55.01	1,214.00	300.00	345.00	50.00	18.40	46.80
Dunbarton .....	67.47	20.00	25.00	1,155.00	.....	298.20	66.00	.....	216.00
Epsom .....	60.61	.....	49.60	1,394.00	.....	502.84	35.00	15.77	105.00
Franklin .....	809.48	8.25	529.51	10,796.18	1,050.02	.....	.....	*	935.75
Henniker .....	169.24	75.00	85.39	3,372.90	250.00	.....	126.60	17.50	114.00
Hill .....	111.32	37.00	40.64	1,185.00	300.00	405.00	35.00	5.00	64.75
Hooksett .....	39.60	60.00	27.62	2,599.00	.....	510.38	75.00	30.00	.....
Hopkinton .....	355.34	.....	106.74	2,978.30	280.00	.....	163.00	25.00	695.15
London .....	200.00	24.00	43.28	2,187.50	.....	93.88	100.00	10.00	.....
Newbury .....	24.23	5.00	25.00	995.00	.....	147.00	37.00	6.00	75.60
New London .....	37.54	.....	76.00	1,171.00	375.00	1,140.00	65.00	.....	347.70
Northfield .....	36.37	.....	.....	882.25	.....	661.78	50.00	10.00	2.60
Pembroke .....	51.76	.....	180.83	2,764.00	479.16	1,672.63	120.00	.....	.....
Pittsfield .....	370.98	.....	176.01	4,399.47	479.16	.....	50.00	10.00	26.00
Salisbury .....	38.90	.....	22.73	807.50	.....	332.67	75.00	3.50	64.50
Sutton .....	129.57	15.00	42.67	1,741.25	.....	310.33	107.70	7.75	18.10
Warner .....	144.01	29.00	44.00	2,324.10	466.66	.....	120.00	8.00	530.70
Webster .....	65.50	.....	47.31	1,070.50	.....	50.00	69.00	.....	89.00
Wilnot .....	104.00	1.50	24.00	960.00	.....	280.00	30.00	8.00	35.00
Total .....	\$6,802.54	\$515.05	\$3,045.05	\$112,325.59	\$7,171.80	\$10,698.98	\$2,280.60	\$826.92	\$4,426.60

\* Janitor acts as truant officer.



MERRIMACK COUNTY.

July 15, 1907.)

ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	† Rate of school assessment.	Average of current expenditure per pupil.
\$14.63	\$10.00	\$78.00	\$69.14	\$96.64	\$2,164.18			\$39.97	\$2,204.15	\$2.96	\$34.35
54.14	30.00	58.05	82.23	40.81	3,858.59				3,858.59	7.15	15.53
37.84	15.00	22.60	71.00	39.01	1,616.58				1,616.58	5.14	24.49
34.00		102.00	315.86		2,747.40				2,747.40	4.43	23.68
7.00		14.50	73.05	45.83	1,898.02				1,898.02	2.44	19.36
31.50	32.25	150.00	27.55		3,417.41			69.89	3,487.30	4.16	32.86
10.00		30.00	62.00	20.00	2,131.69			90.00	2,221.69	4.13	20.11
		58.35	78.03		1,987.49			306.70	2,294.19	5.96	25.81
272.57			148.96	276.07	4,558.37				4,558.37	4.86	23.62
2,632.28	1,537.10	4,906.70	2,434.56	5,554.62	73,724.30	\$8,000.00	\$1,758.00		83,482.30	6.65	27.87
135.85	25.00	438.87	535.00	261.94	6,454.13	500.00		311.16	7,265.29	9.61	20.17
6.70		13.75	56.85	64.81	2,342.23			30.38	2,372.61	4.79	22.31
10.20		29.00	59.90	16.00	1,962.77				1,962.77	4.16	31.16
37.01			69.50		2,269.33				2,269.33	4.38	22.92
833.67	92.00	1,490.96	1,527.38	712.99	18,786.19			1,279.38	20,065.57	6.38	25.95
80.29		248.06	328.29	72.37	4,939.64			80.29	5,019.93	5.39	27.14
16.95	12.00	55.83	84.63	42.54	2,395.66			66.94	2,462.60	3.57	29.58
35.95		63.90	222.86	88.88	3,753.19			60.36	3,813.55	3.74	19.15
161.54	168.70	175.05	205.00	67.28	5,381.10		187.00		5,568.10	4.31	24.46
100.00		72.00	120.00		2,950.66				2,950.66	4.56	27.07
12.00		27.85	38.75	15.00	1,408.48			12.00	1,420.48	3.14	25.15
98.20		98.00	124.50	30.74	3,563.68	7,610.00		100.00	11,273.68	5.19	35.28
4.70		1.50	34.00	19.48	1,702.68				1,702.68	3.13	23.01
60.60		101.50	215.75	77.11	5,723.34				5,723.34	4.54	27.38
119.11		503.85	663.00	379.00	7,176.58				7,176.58	5.93	17.85
90.78		27.00	53.32		1,515.90				1,515.90	3.54	43.31
67.74		59.55	71.60	43.96	2,615.22				2,615.22	6.24	31.89
302.42		55.60	167.44	68.75	4,260.68				4,260.68	4.80	18.61
58.97			45.75	92.57	1,538.60			45.50	1,584.20	4.13	29.03
		13.00	43.00		1,498.50			150.00	1,648.50	5.56	18.05
\$5,326.64	\$1,922.05	\$8,895.47	\$8,028.90	\$8,076.40	\$180,342.59	\$16,110.00	\$1,945.00	\$2,642.67	\$201,040.26	\$4.83	\$25.34

† On one thousand dollars of inventoried valuation.





TABLE No. I.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Atkinson.....	5	5	4	.....	37	30	33.20
Auburn.....	7	.....	2	1	29	26	28.71
Brentwood.....	3	.....	.....	.....	35	34	34.66
Candia.....	8	.....	.....	.....	31	29	30.37
Chester.....	7	.....	.....	.....	34	28	30.65
Danville.....	3	2	.....	.....	30	29	29.66
Deerfield.....	11	.....	4	.....	34	23	23.81
Derry, town district.....	20	13	2	.....	36	36	36.00
Derry, special district.....	2	2	.....	.....	36	36	36.00
East Kingston.....	3	.....	1	.....	37	21	36.50
Epping.....	6	4	1	.....	36	36	36.00
Exeter.....	14	14	.....	.....	36	36	36.00
Fremont.....	5	.....	.....	.....	30	*15	29.75
Greenland.....	2	2	.....	.....	37	37	37.00
Hampstead.....	6	6	.....	.....	36	36	36.00
Hampton.....	5	5	.....	.....	37	34	35.66
Hampton Falls.....	3	.....	1	.....	35	35	35.00
Kensington.....	3	.....	.....	.....	33	33	33.00
Kingston.....	5	5	.....	.....	36	32	34.14
Londonderry.....	9	.....	2	.....	31	28	30.66
Newcastle.....	2	.....	.....	.....	37	37	37.00
Newfields.....	4	3	.....	.....	32	*18	30.86
Newington.....	2	2	.....	.....	36	35	35.70
Newmarket.....	10	8	1	.....	37	36	36.30
Newton.....	4	1	.....	.....	37	37	37.00
North Hampton.....	3	2	.....	.....	37	37	37.00
Northwood.....	6	5	1	.....	30	29	29.83
Nottingham.....	7	.....	3	2	27	27	27.00
Plaistow.....	6	2	.....	.....	36	36	36.00
Portsmouth.....	39	39	1	.....	38	38	38.00
Raymond.....	6	5	1	.....	34	22	28.50
Rye.....	4	.....	.....	.....	37	37	37.00
Salem.....	12	12	2	.....	34	32	33.63
Sandown.....	4	.....	.....	.....	27	*16	23.50
Seabrook.....	8	.....	.....	1	34	28	32.50
South Hampton.....	3	.....	3	2	35	*12	26.00
Stratham.....	4	4	1	.....	36	34	35.40
Windham.....	6	.....	.....	.....	32	25	28.00
Total.....	257	143	30	6	.....	.....	33.03

\* Scholars conveyed.

TABLE No. II.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Atkinson.....	5	.....	.....	5	\$3,300.00	.....
Auburn.....	8	.....	.....	8	2,700.00	\$150.00
Brentwood.....	4	.....	.....	4	2,500.00	100.00
Candia.....	11	.....	.....	11	6,950.00	346.00
Chester.....	7	.....	.....	8	3,000.00	175.00
Danville.....	4	.....	.....	4	2,500.00	100.00
Deerfield.....	13	.....	.....	13	10,000.00	200.00
Derry, town district.....	10	.....	.....	21	25,000.00	500.00
Derry, special district.....	1	.....	.....	2	7,000.00	1,000.00
East Kingston.....	4	.....	.....	4	4,200.00	260.00
Epping.....	8	.....	.....	10	8,900.00	100.00
Exeter.....	12	.....	.....	18	50,000.00	5,000.00
Fremont.....	5	.....	.....	5	3,000.00	150.00
Greenland.....	2	.....	.....	2	7,000.00	125.00
Hampstead.....	7	.....	.....	8	7,000.00	100.00
Hampton.....	4	1	.....	6	10,000.00	400.00
Hampton Falls.....	4	.....	.....	4	2,500.00	60.90
Kensington.....	3	.....	.....	3	2,000.00	75.00
Kingston.....	5	.....	.....	5	3,500.00	70.00
Londonderry.....	9	.....	.....	9	6,800.00	400.00
Newcastle.....	2	.....	.....	2	1,800.00	125.00
Newfields.....	2	.....	.....	3	1,400.00	100.00
Newington.....	1	.....	.....	2	.....	.....
Newmarket.....	9	2	.....	17	9,200.00	100.00
Newton.....	4	.....	1	5	6,000.00	60.00
North Hampton.....	2	.....	.....	4	7,000.00	500.00
Northwood.....	7	.....	.....	10	6,000.00	275.00
Nottingham.....	11	2	.....	11	6,000.00	50.00
Plaistow.....	5	.....	.....	6	6,000.00	300.00
Portsmouth.....	12	1	.....	65	220,000.00	2,000.00
Raymond.....	10	.....	.....	11	5,000.00	50.00
Rye.....	4	.....	.....	4	12,000.00	600.00
Salem.....	9	.....	.....	13	15,675.00	500.00
Sandown.....	4	.....	.....	4	600.00	150.00
Seabrook.....	6	.....	.....	8	6,000.00	300.00
South Hampton.....	4	.....	.....	4	4,000.00	.....
Stratham.....	4	.....	.....	4	3,800.00	100.00
Windham.....	7	.....	.....	7	5,000.00	100.00
Total.....	229	6	1	330	\$483,325.00	\$14,621.00

TABLE No. III.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Atkinson.....	41	44	41	39	3	76	1	.....	2	27	58	49	84	.....	.....
Auburn.....	56	50	69	51	3	115	2	.....	.....	2	104	88	85	.....	.....
Brentwood.....	41	39	51	47	1	97	.....	.....	.....	10	77	66	85	.....	.....
Candia.....	61	63	96	87	4	175	4	.....	.....	5	140	119	84	.....	.....
Chester.....	72	62	69	77	.....	146	.....	.....	.....	19	119	98	82	.....	.....
Danville.....	42	52	46	46	.....	91	1	.....	.....	14	77	70	90	.....	.....
Deerfield.....	82	86	89	95	5	175	4	.....	3	11	167	152	91	.....	.....
Derry, town dist	414	349	367	325	3	684	5	.....	.....	49	609	534	87	10	12
Derry, spec. dist	49	53	39	46	.....	85	.....	.....	.....	20	69	58	84	.....	.....
East Kingston..	38	26	40	22	.....	62	.....	.....	.....	.....	54	45	83	.....	.....
Epping.....	117	130	79	78	1	144	12	.....	.....	1	134	117	87	75	.....
Exeter.....	537	491	481	351	3	794	35	16	.....	.....	748	695	93	.....	170
Fremont.....	50	57	60	57	.....	117	.....	.....	.....	8	103	88	85	1	.....
Greenland.....	43	45	32	47	.....	79	.....	20	.....	.....	65	55	84	.....	.....
Hampstead.....	66	59	70	61	.....	130	1	.....	.....	.....	131	106	80	.....	.....
Hampton.....	69	75	123	114	.....	210	27	42	.....	.....	199	184	92	.....	.....
Hampton Falls.	34	28	28	20	.....	48	.....	9	.....	.....	44	40	91	.....	4
Kensington.....	35	34	35	37	.....	72	.....	.....	.....	.....	59	47	79	.....	.....
Kingston.....	90	82	85	67	3	149	.....	4	.....	42	121	105	87	.....	.....
Londonderry...	142	122	138	125	3	258	2	.....	.....	11	205	178	86	.....	2
Newcastle.....	26	10	27	14	.....	41	.....	3	.....	.....	39	36	92	.....	.....
Newfields.....	48	43	42	40	.....	81	1	.....	.....	16	70	61	87	.....	.....
Newington.....	32	27	43	27	.....	70	.....	3	.....	.....	58	49	84	.....	.....
Newmarket.....	263	289	201	233	14	386	34	9	.....	.....	339	313	92	100	.....
Newton.....	74	67	76	67	.....	140	3	.....	.....	5	122	113	92	.....	.....
North Hampton	42	39	40	42	.....	81	1	20	.....	.....	67	58	86	.....	.....
Northwood.....	82	80	87	83	2	167	1	.....	.....	23	134	122	91	.....	.....
Nottingham.....	48	39	43	38	1	80	.....	4	.....	3	66	54	82	.....	.....
Plaistow.....	86	100	88	101	4	185	.....	.....	.....	8	162	141	87	4	2
Portsmouth.....	887	987	812	876	.....	1,534	154	45	.....	.....	1,541	1,397	90	440	.....
Raymond.....	96	90	117	100	.....	217	.....	.....	.....	3	135	114	84	.....	.....
Rye.....	80	65	66	71	.....	135	2	.....	20	.....	118	103	87	1	5
Salem.....	153	141	179	173	.....	351	1	.....	19	3	281	244	87	.....	.....
Sandown.....	43	35	45	36	.....	79	2	.....	1	.....	54	43	80	2	.....
Seabrook.....	157	131	140	128	3	264	1	.....	.....	.....	207	175	84	.....	.....
South Hampton	18	15	12	14	.....	26	.....	.....	5	.....	24	22	91	.....	.....
Stratham.....	70	64	64	57	.....	119	1	.....	26	.....	96	86	89	.....	.....
Windham.....	48	54	50	47	1	96	.....	.....	.....	4	88	71	80	.....	.....
Total.....	4,332	4,223	4,170	3,939	55	7,759	295	112	143	284	6,884	6,096	89	633	195

\* Between five and sixteen inclusive.

† Out of state.

## TABLE No. IV.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Atkinson.....			5	\$34.00				2	1
Auburn.....			10	27.00	3	4	1	2	
Brentwood.....	1	\$32.00	6	32.00	1	1			
Candia.....			16	29.33	5	4	1		1
Chester.....			13	27.80	3	2	1		
Danville.....			4	33.33	1			1	
Deerfield.....	1	60.00	13	27.22	2	10	1	1	1
Derry, town district ..	1	57.33	24	36.33	5		7	6	2
Derry, special district.			2	38.00	1			1	
East Kingston.....			4	29.25		1			3
Epping.....	1	83.33	7	40.40	1	1	2		2
Exeter.....	1	88.88	17	40.69	1		3	2	
Fremont.....			6	31.74	1		1		
Greenland.....	1	48.00	4	46.00		1	2		
Hampstead.....	1	70.00	7	33.13				1	2
Hampton.....			5	26.00			1		
Hampton Falls.....			4	29.00	1				1
Kensington.....			3	28.00			1		
Kingston.....			8	31.60	1			1	
Londonderry.....	2	33.00	13	35.14	1		2		
Newcastle.....			2	34.00		1	1		
Newfields.....			4	36.00			3	1	
Newington.....			2	40.00			1	1	
Newmarket.....			10	37.46	1	2	4		
Newton.....			4	35.50					
North Hampton.....			3	46.00			3		
Northwood.....			5	33.60					
Nottingham.....			7	27.85	5	3			
Plaistow.....			7	33.33	1	1	3		
Portsmouth.....	3	133.33	39	51.26			2	29	4
Raymond.....	1	68.00	6	32.00		3			1
Rye.....			4	44.00					
Salem.....			12	36.36			3	3	1
Sandown.....	1	30.00	3	30.00	2	1			
Seabrook.....	3	34.66	5	30.00		1	1		
South Hampton.....			3	26.00	1			1	
Stratham.....			7	36.50	1		3		
Windham.....			6	31.66	2		2		
Total.....	17	\$65.15	300	\$35.98	40	36	49	51	19

TABLE No. V.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Atkinson	\$900.00	\$800.00		\$60.39				\$139.00	\$25.00	\$1,924.39
Auburn	1,297.50	150.00	\$94.82	65.27				121.45		1,729.04
Brentwood	915.00			61.61				110.26		1,086.87
Candia	1,635.00	500.00		112.24		\$17.63		167.95	562.23	2,995.05
Chester	1,417.50	100.00	76.72	90.28				172.85	28.50	1,885.85
Danville	615.00	235.00		64.66	\$6.00	19.99	\$137.74	66.00		1,144.39
Deerfield	1,755.00		100.00	125.05	200.11		170.03	57.45	52.65	2,460.29
Derry, town	4,217.47	7,049.80	503.92	441.09	101.78	351.93	425.00	482.34	95.70	13,674.08
Derry, special	755.03	427.00	91.08	63.38	18.22	197.95	75.00	86.35		1,714.01
East Kingston	675.00			33.55	292.26			99.00		1,099.81
Epping	2,205.00	1,100.00	100.00	96.36	120.00		275.00	171.55		4,067.93
Exeter	9,975.00	1,900.00	1,000.00	462.99				563.47	477.50	14,378.96
Freemont	832.50			80.30				80.60	14.46	1,007.86
Greenland	1,425.00	400.00	91.14	52.46	35.00		100.00	55.65		2,159.25
Hampstead	1,192.50	1,100.00		100.65				129.37	18.05	2,540.57
Hampton	2,317.50	1,200.00	220.39	116.51				159.50	635.00	4,648.90
Hampton Falls	862.50	62.50	73.51	41.48				87.30	21.25	1,148.54
Kensington	720.00	35.00		44.53				76.00		875.53
Kingston	960.00	400.00		114.07	75.60	107.00	208.51	180.88	4.00	2,050.06
Loudonderry	2,212.50	1,200.00		170.19	20.00	29.70		124.00	12.59	3,768.98
Newcastle	1,132.50			28.67					5.00	1,166.17
Newfields	862.50	327.50	100.00	55.51	45.32	131.00		52.30	50.00	1,624.13
Newington	870.00			43.92			100.00	52.25		1,066.17
Newmarket	3,922.50	4,000.00		261.69			325.00	159.45		8,668.64
Newton	997.50	200.00	218.97	98.82			283.04	171.43	29.50	1,999.26
North Hampton	2,302.50									2,392.50
Northwood	1,815.00	200.00	104.89	143.96	81.00	155.97		122.36		2,623.18
Nottingham	1,042.50	600.00	100.00	53.68				108.00	6.50	1,910.68
Plaistow	952.50	700.00	75.00	123.83		4.89	296.98	221.40	20.00	2,394.60
Portsmouth	34,012.50	17,987.50		966.85				997.76	2,301.58	56,266.19
Raymond	1,687.50	212.50		118.34				146.48	155.33	2,320.15
Rye	3,127.50	200.00		101.26			200.00	175.20	19.00	3,822.96
Salem	2,160.00			201.91	36.90	58.81		294.20	95.00	2,846.82
Sandown	480.00	100.00	44.00	43.31				51.04		718.35
Seabrook	817.50	902.50	150.00	165.31		67.13	679.26	97.64	39.49	2,948.83
South Hampton	540.00	60.00	50.00	21.96				36.20	8.00	716.16
Stratham	1,395.00	300.00		84.79			150.00	81.40	28.75	2,039.94
Windham	1,012.50	287.50		72.50				169.93	114.44	1,656.96
Total	\$96,045.00	\$42,736.80	\$3,199.44	\$4,983.48	\$1,032.19	\$1,142.00	\$3,425.56	\$6,068.01	\$4,819.57	\$163,452.05

\* Literary fund held by town treasurer.



TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Atkinson .....	\$139.78			\$1,246.00		\$432.00	\$43.00	\$3.00	
Auburn .....	28.94		\$61.83	1,520.80		120.00	80.00		\$133.00
Brentwood .....	84.91	\$18.50	41.47	834.50		188.00	36.00	5.00	165.00
Candia .....	68.00	72.00	93.34	1,596.50		90.00	84.00	9.00	262.65
Chester .....	5.13		68.90	1,496.60		316.00	100.00		127.00
Danville .....	21.11		32.68	750.00			30.00	5.00	144.00
Deerfield .....	173.00	78.00	133.65	1,846.00		380.84	84.50	7.85	139.75
Derry, town district .....	356.21	33.20	255.47	6,614.70	\$850.00	550.00	187.23	25.00	59.70
Derry, special district .....	25.00		59.48	692.00	150.00	300.00	25.00		
East Kingston .....	25.00		15.00	720.00			40.00	5.00	195.00
Epping .....				2,616.29	529.08		45.00	50.00	600.00
Exeter .....	683.77		509.56	8,747.72			225.00	50.00	521.00
Fremont .....	121.47		21.60	1,148.00			33.00	6.00	65.00
Greenland .....	47.03		44.11	1,122.00	245.00	635.79	45.00	3.00	400.00
Hampstead .....	117.19	8.40		2,089.50			10.50	5.00	
Hampton .....	344.23	40.00	220.39	3,706.29			30.00		354.00
Hampton Falls .....	20.00	12.50	41.01	761.25		236.00	40.00		129.60
Kensington .....	46.02		27.18	660.00		89.50	35.45	2.00	
Kingston .....	46.54		40.00	1,340.60		535.00	55.00		
London derry .....	367.83	9.00	105.27	2,476.20		344.65	127.89	18.00	71.25
Newcastle .....	42.35		19.30	629.00		180.00	20.00	5.00	
Newfields .....	7.45		26.81	1,110.40		284.43	70.00		
Newington .....	19.66		19.84	798.00	200.00	120.00	14.00		
Newmarket .....	477.48		186.14	5,481.05	695.83		75.00	50.00	71.60
Newton .....	128.97	25.00	90.00	1,313.50		102.00	60.00		
North Hampton .....	116.23		68.36	1,446.00			55.00		170.75
Northwood .....	78.94		25.93	1,469.00		426.85	75.00	12.50	332.00
Nottingham .....	40.00		60.00	1,309.00		180.35	75.00	15.00	78.50
Plaistow .....	75.00	8.50	96.00	1,774.00		121.00	62.00	4.00	
Portsmouth .....	1,307.62	207.89	945.59	34,699.51	1,850.00				97.50
Raymond .....	90.23			1,544.03	50.00	100.00	55.00		283.02
Rye .....	112.25	28.25	107.77	1,797.40	400.00	820.00	70.00	7.00	
Salem .....	202.55	18.00	177.36	3,438.00		922.25	100.00		140.00
Sandown .....	34.74		9.65	495.00		20.00	101.77	5.00	
Seabrook .....	140.06		18.24	2,074.30		167.00	70.00	50.00	
South Hampton .....	25.14		3.85	513.50		25.00	22.00		18.00
Stratham .....	100.00		37.36	1,257.50	300.00	701.25	54.62		
Widham .....	55.15		20.22	1,270.00		72.00	78.00		32.50
Total .....	\$5,804.98	\$559.24	\$3,773.86	\$104,404.14	\$5,269.91	\$8,459.91	\$2,413.96	\$342.35	\$4,590.82



ROCKINGHAM COUNTY.

July 15, 1907.)

ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$49.00		\$37.00	\$90.00	\$4.00	\$2,043.78				\$2,043.78	\$4.71	\$35.24
107.02		7.25	70.65	16.73	2,146.22				2,146.22	4.14	20.64
			72.39		1,415.77				1,415.77	3.22	18.39
21.05		12.75	68.59	16.25	2,394.13			\$130.94	2,525.07	6.16	17.10
60.01		10.29	86.47	47.23	2,317.63				2,317.63	3.90	19.48
3.00		8.00	56.79	39.50	1,090.08			100.00	1,190.08	4.41	14.16
18.00		5.00	69.50	38.50	2,972.59				2,972.59	3.84	17.80
351.67	\$340.50	498.05	698.29	1,051.73	11,871.75	\$3,281.52	\$1,424.80		16,578.07	7.44	19.49
54.40		96.05	115.57	15.60	1,563.10				1,563.10	4.95	22.65
15.00		4.00			1,060.00				1,060.00	2.91	19.63
101.46		108.00	136.20	46.82	4,232.85				4,232.85	4.04	31.50
1,060.23		836.58	1,070.38	171.63	13,965.87				13,965.87	3.96	18.67
14.50	30.00		35.35	19.30	1,494.22				1,494.22	3.55	14.50
23.97		70.00	41.75	82.13	2,759.78				2,759.78	5.04	42.46
61.69	47.00	43.15	140.46	54.15	2,577.04				2,577.04	5.89	19.67
101.39	2.00	84.85	265.65	177.86	5,326.66				5,326.66	4.03	26.77
30.72		30.00	75.50	18.15	1,394.73				1,394.73	2.93	31.70
40.53		14.60	55.00	22.00	992.28				992.28	3.36	16.82
		29.50	78.15	47.32	2,172.11				2,172.11	3.43	17.95
52.48		25.75	125.07	122.68	3,846.07				3,846.07	5.44	18.76
7.13		44.78	70.63	35.06	1,053.75				1,053.75	4.32	27.02
16.80		72.00	150.87	54.72	1,793.48				1,793.48	6.27	25.62
2.84	18.67	38.00		38.56	1,260.57			11.64	1,281.21	4.05	21.89
	26.02	603.74	363.87	225.39	8,256.12		74.35	116.91	8,447.38	5.88	24.35
2.50		87.54	143.69	16.50	1,969.00	1,037.50	112.50	67.82	3,187.52	3.20	16.15
	20.00	42.00	89.60	149.72	2,157.66				2,157.66	3.11	32.20
12.50			30.50	54.23	2,517.45	1.00			3,066.20	4.40	18.79
9.00			80.00	7.00	1,853.85				1,853.85	4.69	28.09
21.80		97.15	140.50	11.00	2,410.95			120.00	2,530.95	4.14	14.88
1,040.71	62.50	4,093.80	3,637.69	1,637.79	49,580.60	5,000.00			54,580.60	4.71	32.17
13.85		24.80	81.00	10.00	2,251.93			33.45	2,285.38	4.67	16.68
122.00		86.25	177.50	93.71	3,822.13				3,822.13	4.63	32.39
235.00		409.52	388.18	43.76	6,074.62		74.08	118.07	6,266.77	6.03	21.62
1.50	2.10	4.50	27.00		701.26			121.31	822.57	3.52	12.99
13.79		7.00	135.75	22.30	2,698.44			226.73	2,925.17	4.88	13.04
			33.00		640.49			4.96	645.45	3.58	26.69
48.00		45.45	120.00		2,664.18				2,664.18	4.82	27.75
		39.75	64.78	3.19	1,635.59			116.76	1,752.35	3.30	18.59
\$3,713.54	\$548.79	\$7,617.10	\$9,097.32	\$4,392.51	\$160,988.43	\$9,320.02	\$1,685.73	\$1,716.34	\$173,710.52	\$4.41	\$23.39

\* On one thousand dollars of inventoried valuation.



TABLE No. I.—STRAFFORD COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Barrington.....	11	.....	4	.....	35	32	33.10
Dover.....	35	35	.....	.....	37	37	37.00
Durham.....	5	5	.....	.....	36	36	36.00
Farmington, town district.....	4	.....	2	.....	35	34	34.25
Farmington, special district.....	6	6	1	.....	40	36	37.40
Lee.....	3	.....	.....	1	34	32	33.33
Madbury.....	3	.....	3	3	32	32	32.00
Middleton.....	3	.....	.....	.....	24	24	24.00
Milton.....	10	8	3	.....	37	35	36.00
New Durham.....	7	.....	3	.....	29	22	24.71
Rochester.....	25	24	.....	.....	37	37	37.00
Rollinsford.....	10	6	2	.....	36	21	33.50
Somersworth.....	21	19	2	.....	37	36	36.26
Strafford.....	11	.....	3	6	28	25	26.25
Total.....	154	103	23	10	.....	.....	34.48

TABLE No. II.—STRAFFORD COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Barrington .....	12			12	\$7,000.00	\$100.00
Dover .....	13			49	250,000.00	4,000.00
Durham .....	6			8	10,000.00	100.00
Farmington, town .....	8	1		8	5,000.00	50.00
Farmington, special .....	4			8	28,000.00	1,200.00
Lee .....	3			3	3,000.00	100.00
Madbury .....	3			3	1,600.00	100.00
Middleton .....	4			4	1,400.00	50.00
Milton .....	10			14	13,000.00	500.00
New Durham .....	8			8	3,600.00	100.00
Rochester .....	7	1		41	140,160.00	1,200.00
Rollinsford .....	6			10	15,000.00	2,500.00
Somersworth .....	6			27	100,000.00	2,000.00
Strafford .....	13	2		13	4,400.00	150.00
Total .....	103	6		208	\$582,160.00	\$12,150.00

TABLE No. III.—STRAFFORD COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Barrington.....	105	88	102	92	4	183	2	...	9	6	170	136	80	.....	17
Dover.....	1,121	1,214	747	811	...	1,434	324	42	...	...	1,447	1,341	92	944	...
Durham.....	75	84	70	78	...	147	1	...	13	2	121	109	90	2	...
Farmington, town.	34	23	33	29	1	60	1	...	9	4	46	40	87	.....	...
Farmington, spec.	123	116	151	146	...	262	35	11	...	...	259	238	91	.....	...
Lee.....	34	26	36	30	3	59	4	...	...	...	54	43	80	.....	...
Madbury.....	28	23	27	20	3	43	1	...	5	...	35	32	91	.....	...
Middleton.....	23	22	24	22	...	43	3	...	1	...	41	35	85	.....	...
Milton.....	148	151	146	171	1	311	5	...	...	...	247	216	87	.....	...
New Durham.....	63	38	73	46	1	115	3	...	6	...	106	95	90	.....	...
Rochester.....	730	733	632	647	...	1,184	95	9	...	...	1,071	991	92	260	...
Rollinsford.....	160	170	171	135	1	304	1	...	23	...	246	219	89	20	2
Somersworth.....	684	732	466	437	...	855	48	...	...	...	750	703	93	599	...
Strafford.....	65	57	68	50	6	111	1	...	1	41	103	87	84	.....	...
Total.....	3,393	3,477	2,746	2,714	20	5,116	324	62	74	53	4,696	4,285	91	1,825	19

\* Between five and sixteen inclusive.

TABLE No. IV.—STRAFFORD COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Barrington .....			13	\$27.60	1	4	3	3	....
Dover .....	1	\$100.00	34	48.53	....	....	15	2	....
Durham .....			5	43.73	....	....	4	1	....
Farmington, town.			5	30.00	1	....	....	....	....
Farmington, spec.	1	95.00	6	39.46	1	....	1	....	....
Lee .....			6	34.66	....	....	....	....	....
Madbury .....	1	32.00	2	32.00	....	....	1	2	....
Middleton .....			4	28.00	1	4	1	1	....
Milton .....	2	66.66	11	34.36	6	....	4	3	1
New Durham .....	1	28.00	9	29.00	1	1	2	....	....
Rochester .....			25	43.24	2	....	23	....	2
Rollinsford .....			10	38.80	3	1	6	....	....
Somersworth .....	1	90.00	20	46.60	1	....	1	....	....
Strafford .....			11	25.27	4	1	....	....	....
Total .....	7	\$68.33	161	\$41.58	21	11	61	12	....

TABLE No. V.—STRAFFORD COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Barrington.....	\$1,597.50	\$650.00	.....	\$130.54	.....	\$298.40	\$154.76	\$224.60	.....	\$3,055.80
Dover.....	31,560.00	2,920.00	\$1,900.00	932.69	.....	.....	.....	1,689.90	\$1,654.00	40,656.59
Durham.....	2,145.00	200.00	150.00	92.00	.....	.....	.....	50.80	18.00	2,655.80
Farmington*....	932.14	.....	104.34	49.28	\$870.26	.....	.....	69.23	.....	2,025.25
Farmington†....	3,020.36	1,200.00	.....	156.92	.....	.....	.....	224.32	2,946.22	7,547.82
Lee.....	1,057.50	.....	.....	40.26	.....	.....	.....	85.20	.....	1,182.96
Madbury.....	997.50	.....	.....	37.21	11.40	.....	.....	76.46	8.00	1,130.57
Middleton.....	307.50	.....	.....	34.77	20.00	4.00	.....	94.72	374.25	835.24
Milton.....	2,685.00	300.00	600.00	170.80	1,743.07	.....	300.00	267.46	110.96	6,177.29
New Durham....	652.50	122.17	.....	76.25	180.00	60.00	175.69	174.92	71.00	1,512.53
Rochester.....	15,232.50	7,767.50	.....	764.33	.....	.....	.....	1,185.39	187.93	25,137.65
Rollinsford.....	4,125.00	1,428.00	.....	147.15	.....	.....	.....	132.20	360.93	6,193.28
Somersworth.....	10,942.50	9,258.14	.....	592.92	35.30	.....	.....	576.13	130.14	21,535.13
Strafford.....	1,680.00	800.00	.....	108.90	60.00	456.36	.....	173.57	.....	3,278.83
Total.....	\$76,935.00	\$24,645.81	\$2,754.34	\$3,334.02	\$2,920.03	\$818.76	\$630.45	\$5,024.90	\$5,861.43	\$122,924.74

\* Town district.

† Special district.



TABLE No. VI.—  
For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Barrington .....	\$47.16		\$26.80	\$2,469.00		\$341.33	\$115.00		\$25.00
Dover .....	961.56	\$42.24	907.64	27,290.20	\$2,000.00		120.00	\$550.00	1,945.00
Durham .....	156.00		68.00	1,862.00		498.00	50.00	10.00	200 00
Farmington * .....	79.34		25.00	1,028.00		349.67	125.00	8.00	216.00
Farmington † .....	488.93	247.54	121.21	5,471.68	180.00		232.75	45.50	
Lee .....			108.91	858.00			60.00		
Madbury .....	34.00		9.13	704.00		113.00	45 00		25.00
Middleton .....	11.12			504.00		40.00	32.00	5.00	
Milton .....	120.07		90.82	3,798.50	600.00		63.75	27.35	414.47
New Durham .....	97.98		7.25	1,207.10		65.00	68.50		20.00
Rochester .....	617.15	221.00	528.14	15,118.58	1,049.94				3,299.50
Rollinsford .....	220.23		133.76	3,135.00		302.93	150.00	30.00	248.50
Somersworth .....	665.86		402.70	12,817.71			150.00	165.00	644.00
Strafford .....			19.95	1,653.50		952.24	77.00	10.00	132.50
Total .....	\$3,499.40	\$510.78	\$2,449.31	\$77,917.27	\$3,829.94	\$2,662.17	\$1,289.00	\$850.85	\$7,269.97

\* Town district.

† Special district.

## STRAFFORD COUNTY.

July 15, 1907.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	† Rate of school assessment.	Average of current expenditure per pupil.
\$150.00			\$160.50		\$3,334.79				\$3,334.79	\$4.06	\$19.61
85.00	\$9.10	\$2,626.09	3,050.29	\$1,333.77	40,835.89		\$2,100.00	\$1,601.63	44,537.52	3.96	28.22
8.50		160.00	204.00	95.00	3,388.00				3,388.00	3.89	28.00
97.52	30.00	793.50	48.25	16.04	1,903.80				1,903.80	3.63	41.32
11.30		15.00	495.30	290.33	8,494.26				8,494.26	6.63	32.79
.88			50.00		1,053.21			98.70	1,151.91	3.74	19.50
110.33			11.75		981.01			36.48	1,017.49	3.99	28.03
71.41		417.50	423.96	64.95	6,131.70	\$23.18			6,270.52	2.43	14.72
607.39		1,814.17	39.47	14.00	1,590.71			164.94	6,296.64	3.79	24.82
26.07	28.00	286.50	238.93	282.33	5,182.25	\$5,000.00		160.00	30,227.26	3.16	15.00
1,152.97	346.50	1,514.00	1,618.62	856.50	20,333.86				5,182.25	4.98	21.07
52.99			68.44	23.95	2,990.57			1,200.64	21,534.50	4.99	27.11
								52.99	3,043.56	5.59	29.03
\$2,374.36	\$413.60	\$7,626.76	\$7,174.54	\$4,023.23	\$121,891.18	\$5,023.18	\$2,100.00	\$3,386.79	\$132,401.15	\$4.31	\$28.45

† On one thousand dollars of inventoried valuation.

‡ Indebtedness.



TABLE No. I.—SULLIVAN COUNTY.

(For the year ending July 15, 1907.)

SCHOOLS BELOW HIGH SCHOOL.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Acworth .....	6	9	3	1	23	22	22.70
Charlestown .....	9	26	1		34	34	34.00
Claremont .....	26				36	36	36.00
Cornish .....	11		6		29	*10	26.45
Croydon .....	2				30	28	29.00
Goshen .....	4		3	1	27	25	26.75
Grantham .....	3	2	1		30	29	29.66
Langdon .....	2	2	1		30	25	27.50
Lempster .....	4		1		29	27	28.00
Newport .....	14	14			36	32	34.57
Plainfield .....	9		4	3	31	*7	26.12
Springfield .....	7		2	1	24	*12	20.67
Sunapee .....	8	7	1	1	34	20	31.37
Unity .....	6		3		28	24	26.50
Washington .....	5			3	32	*13	25.60
Total .....	116	60	25	10			29.94

\* Scholars conveyed.

TABLE No. II.—SULLIVAN COUNTY.

(For the year ending July 15, 1907.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Acworth.....	12	3	.....	13	\$4,000.00	\$250.00
Charlestown.....	7	.....	.....	11	10,000.00	125.00
Claremont.....	16	1	.....	31	80,000.00	150.00
Cornish.....	13	.....	.....	13	5,250.00	150.00
Croydon.....	4	.....	.....	4	5,000.00	100.00
Goshen.....	5	.....	.....	5	600.00	100.00
Grantham.....	2	.....	.....	3	1,400.00	150.00
Langdon.....	5	1	.....	5	1,200.00	100.00
Lempster.....	6	.....	.....	6	2,000.00	150.00
Newport.....	9	1	.....	18	50,000.00	1,500.00
Plainfield.....	14	.....	.....	15	3,000.00	200.00
Springfield.....	8	.....	.....	8	1,450.00	100.00
Sunapee.....	7	.....	.....	10	12,000.00	200.00
Unity.....	7	.....	.....	7	4,200.00	255.00
Washington.....	7	2	.....	7	2,000.00	100.00
Total.....	122	8	.....	156	\$182,100.00	\$3,630.00

TABLE No. III.—SULLIVAN COUNTY.

(For the year ending July 15, 1907.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.
	Boys.	Girls.	Boys.	Girls.											
Acworth .....	45	28	47	37	...	79	5	...	1	...	76	66	86	...	...
Charlestown .....	103	107	104	107	...	207	4	...	...	...	191	176	92	...	...
Claremont .....	584	604	560	537	14	991	92	10	...	...	947	885	93	327	14
Cornish .....	92	64	101	78	3	174	2	...	...	...	146	124	85	...	2
Croydon .....	29	14	26	18	...	44	...	...	2	...	37	33	89	...	...
Goshen .....	28	18	22	20	1	35	2	...	...	...	34	30	88	...	...
Grantham .....	46	39	38	30	...	67	1	...	...	...	52	43	83	...	...
Langdon .....	30	23	21	22	...	42	1	...	...	1	39	36	92	...	...
Lempster .....	32	29	38	39	...	73	4	...	1	1	56	50	89	...	...
Newport .....	209	212	296	294	13	521	56	9	...	...	474	413	87	...	2
Plainfield .....	61	73	52	69	...	121	...	...	...	21	110	100	90	...	...
Springfield .....	42	44	48	40	2	77	9	...	...	3	84	72	85	...	2
Sunapee .....	115	90	114	79	...	189	4	...	7	11	165	139	84	...	...
Unity .....	70	41	83	34	1	112	4	...	3	1	83	67	80	...	...
Washington .....	23	32	31	36	1	59	7	...	1	5	47	42	89	...	...
Total .....	1,509	1,418	1,581	1,440	35	2,795	191	19	15	43	2,541	2,276	90	327	20

\* Between five and sixteen inclusive.

TABLE No. IV.—SULLIVAN COUNTY.

(For the year ending July 15, 1907.)

## TEACHERS BELOW HIGH SCHOOLS.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Acworth.....			8	\$23.22	3	7			
Charlestown.....			9	36.78		2	2		1
Claremont.....	1	\$88.88	24	42.00			13		2
Cornish.....	2	32.00	12	27.00	2	2	2	5	
Croydon.....	1	36.00	2	30.00		2			1
Goshen.....			7	24.00	1	4			
Grantham.....	1	34.00	3	32.66	1		1	1	
Langdon.....			4	31.00	2				
Lempster.....			6	23.33		2			
Newport.....	1	32.00	13	36.62	2	2	4	1	1
Plainfield.....			12	24.25	5	5		7	
Springfield.....	2	24.00	7	21.68	1				1
Sunapee.....	1	35.00	7	34.42		1	4		
Unity.....			10	23.45	3	7			
Washington.....	1	20.00	5	24.26	1	4			
Total.....	10	\$35.79	129	\$30.65	21	38	26	14	6



TABLE No. V.—SULLIVAN COUNTY.

(For the year ending July 15, 1907.)

## REVENUE.

TOWNS.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Literary fund.	Local funds.	Rebate for high school tuition.	State appropriation for schools under law of 1899.	Dog licenses.	Amount from all other sources.	Total.
Acworth .....	\$735.00	\$350.00	.....	\$62.83	.....	\$3.46	\$111.60	\$1.80	.....	\$1,264.69
Charlestown .....	2,422.50	2,427.50	.....	142.13	\$11.50	.....	175.00	91.92	.....	5,270.55
Claremont .....	9,637.50	10,500.00	.....	656.97	*6,200.00	.....	700.00	643.20	\$300.00	28,637.67
Cornish .....	1,447.50	450.00	\$169.26	95.77	.....	.....	.....	62.58	37.50	2,262.61
Croydon .....	540.00	.....	38.62	32.94	32.59	.....	.....	37.43	6.00	687.58
Goshen .....	435.00	.....	.....	35.38	.....	.....	53.70	87.07	.....	611.15
Grantham .....	412.50	.....	.....	50.63	69.29	6.85	103.55	71.80	.....	714.62
Langdon .....	532.50	250.00	.....	33.55	.....	.....	50.00	68.20	.....	934.25
Lempster .....	405.00	200.00	60.67	48.89	49.58	20.00	93.35	79.40	.....	956.80
Newport .....	5,895.00	9,350.00	.....	354.41	94.00	.....	450.00	482.92	273.75	16,900.08
Plainfield .....	1,470.00	.....	.....	165.00	80.24	.....	.....	205.95	.....	1,921.19
Springfield .....	450.00	250.00	.....	61.00	.....	31.06	176.16	100.69	9.75	1,078.66
Sunapee .....	1,732.50	1,216.00	.....	148.84	.....	.....	262.50	152.40	619.75	4,131.99
Unity .....	547.50	200.00	.....	71.37	176.65	.....	144.24	82.76	.....	1,222.52
Washington .....	750.00	.....	75.00	50.63	.....	.....	83.23	27.80	8.00	994.66
Total .....	\$27,412.50	\$25,193.50	\$343.55	\$2,010.25	\$6,713.85	\$61.37	\$2,403.33	\$2,195.92	\$1,254.75	\$67,589.02

\* Stevens High School.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Akworth.....	\$105.87		\$34.22	\$721.50		\$98.00	\$60.00	\$7.00	\$230.00
Charlestown.....	125.00	\$80.00	125.00	2,800.00	\$350.00		150.00	8.00	528.10
Claremont.....	1,047.66	250.00	850.00	14,458.57	1,400.00		50.00	28.00	1,751.50
Cornish.....	109.26		59.00	1,844.50			107.00	13.25	114.50
Croydon.....			38.62	480.50		36.00	36.00	5.00	30.00
Goshen.....	33.00	9.25	5.00	582.00			31.00	5.00	
Graham.....	34.67		16.05	698.30			25.00	4.00	
Langdon.....	30.00	19.75	40.00	407.50	87.16				124.00
Lempster.....	38.62		22.05	670.00		17.00	65.00	4.75	76.00
Newport.....	479.97	40.00	520.18	7,093.96	900.00		75.00		249.00
Plainfield.....	100.00		42.49	1,419.30		800.00	100.00	9.00	171.50
Springfield.....			48.00	814.50		96.00	30.00	4.00	40.00
Sunapee.....	141.00	13.50	100.14	2,016.00	525.00	524.59	35.00	10.25	17.60
Unity.....	70.00		14.60	1,024.00		94.00	36.00	4.50	
Washington.....			20.60	810.00		220.30	34.25	5.00	30.00
Total .....	\$2,315.05	\$412.50	\$1,935.95	\$35,930.63	\$3,262.16	\$1,885.89	\$834.25	\$107.75	\$3,362.20

SULLIVAN COUNTY.

July 15, 1907.)

ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$14.15	\$84.00	\$21.00	\$45.62	\$27.08	\$1,448.44				\$1,448.44	\$3.78	\$19.06
14.80	82.00	315.75	469.94	132.88	5,271.47				5,271.47	5.36	27.59
486.43	45.50	873.35	1,366.68	1,125.12	23,732.81		\$144.00		23,876.81	4.68	25.06
.....	.....	27.00	115.50	110.50	2,500.51			\$86.31	2,586.82	2.93	17.13
21.56	.....	8.55	32.50	29.75	718.48				718.48	2.42	19.42
.....	.....	9.00	21.00	.....	615.25			43.59	738.84	3.03	20.45
.....	.....	9.15	15.50	10.86	813.53			85.48	899.01	2.81	15.64
5.75	.....	18.75	26.25	68.50	827.66			61.82	889.48	3.68	21.22
.....	.....	20.50	64.40	12.85	991.17			50.00	1,041.17	3.67	17.70
797.54	74.63	1,001.48	1,000.88	248.43	12,481.07	\$4,000.00	500.00	781.04	17,762.11	8.50	26.33
15.19	.....	25.98	73.50	42.56	2,799.52			47.12	2,846.64	2.58	25.45
4.15	.....	.....	3.50	11.59	1,051.74				1,051.74	3.06	12.52
82.12	.....	168.10	294.36	421.43	4,349.09			700.00	5,049.09	3.50	26.36
8.23	.....	14.00	65.50	.....	1,330.83				1,330.83	3.23	16.03
.....	15.75	8.25	25.25	.....	1,169.40				1,169.40	3.08	24.88
\$1,449.92	\$301.88	\$2,520.86	\$3,620.38	\$2,241.55	\$60,180.97	\$4,000.00	\$644.00	\$1,855.39	\$66,680.33	\$3.75	\$23.68

\* On one thousand dollars of inventoried valuation.



APPENDIX B.  
STATISTICAL TABLES.  
1908.

TABLE No. I.—BELKNAP COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Alton .....	7	3	3	.....	36	30	\$2.57
Barnstead .....	13	.....	3	2	28	*8	26.00
Belmont .....	10	5	12	1	34	*10	29.40
Center Harbor .....	5	3	12	1	27	24	26.24
Gilford .....	9	.....	5	1	25	*18	23.00
Gilmanton .....	12	.....	6	2	30	*18	29.91
Laconia .....	28	26	.....	.....	36	36	36.00
Meredith, town district .....	8	8	5	.....	31	30	30.12
Meredith, special district .....	3	3	.....	.....	33	33	33.00
New Hampton .....	10	.....	3	3	32	20	22.70
Sanbornton .....	9	.....	4	.....	34	23	29.88
Tilton, town district .....	4	1	1	.....	38	31	35.00
Tilton, Union district .....	9	9	.....	.....	36	36	36.00
Total .....	127	58	34	10	.....	.....	30.20

\* Scholars conveyed.

TABLE No. II.—BELKNAP COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Alton .....	11	.....	.....	14	\$8,600.00	\$400.00
Barnstead .....	13	.....	.....	13	5,000.00	200.00
Belmont .....	7	.....	.....	11	10,000.00	150.00
Center Harbor .....	4	.....	.....	5	2,350.00	50.00
Gilford .....	10	.....	.....	10	4,400.00	125.00
Gilmanton .....	17	4	.....	17	4,700.00	200.00
Laconia .....	10	.....	.....	33	130,000.00	3,000.00
Meredith, town district.	12	.....	.....	12	4,000.00	300.00
Meredith, special district	1	.....	.....	4	5,000.00	200.00
New Hampton .....	12	.....	.....	12	5,000.00	200.00
Sanbornton .....	13	1	.....	14	6,700.00	310.00
Tilton, town district .....	4	.....	.....	4	5,000.00	150.00
Tilton, Union district .....	1	.....	.....	9	2,500.00	500.00
Total .....	115	5	.....	158	\$193,250.00	\$5,785.00



TABLE No. III.—BELKNAP COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Number not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Alton .....	91	94	97	104	2	190	9				170	152	89			
Barnstead .....	74	92	75	100	2	171	2		16	4	161	141	87		1	
Belmont .....	114	124	103	141	3	240	1		3	7	217	193	88			
Center Harbor ...	38	34	36	40		75	1		4	3	59	53	90			
Gilford .....	58	67	53	60	1	108	4		10		100	94	92	3		13
Gilmanton .....	90	99	87	85	1	169	2			14	134	116	86			
Laconia .....	761	792	524	579	4	990	109	22			961	933	97	450		
Meredith, town ..	65	68	65	50		112	3		3	12	87	78	89			
Meredith, special.	64	46	73	68		129	12	8	4	4	119	113	95			
New Hampton ...	76	51	83	55	3	133	2		1	23	99	92	93		3	
Sanbornton .....	86	68	77	67	3	139	2		4	9	118	102	86			
Tilton, town .....	39	57	44	59	1	99	3				84	75	88			
Tilton, Union ....	141	139	158	157		305	10			31	286	270	94			
Total .....	1,697	1,731	1,475	1,565	20	2,860	160	30	45	107	2,595	2,412	93	453	4	5

\* Between five and sixteen inclusive.

TABLE No. IV.—BELKNAP COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Alton .....			9	\$33.25	3		3		
Barnstead .....	1	\$30.00	12	28.00	3		3	1	
Belmont .....	1	64.00	13	34.11		1	1	1	1
Center Harbor. ....			6	30.66	1	3	1	1	
Gilford. ....			11	28.00	2	4	3	1	
Gilmanton .....	1	22.00	18	24.32	2	7			1
Laconia .....			28	41.96	2	9	14		1
Meredith, town. ....	1	28.00	8	28.75					
Meredith, special. ....			3	37.33			3		
New Hampton .....	2	26.00	18	26.50	5	3			
Sanbornton .....	1	24.00	11	24.00	2	2	1		1
Tilton, town. ....			6	37.19		2			
Tilton, Union. ....	1	40.00	8	40.00			3	1	
Total .....	8	\$32.50	151	\$31.98	19	36	31	5	4

TABLE No. V.—

(For the year ending

REVE

TOWNS.	Balance from previous year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Alton .....	\$171.97	\$2,032.50	\$1,850.00	\$375.00	.....	\$73.00	\$117.12	.....	\$283.33
Barnstead.....	130.73	1,815.00	200.00	.....	\$504.28	145.00	111.02	.....	.....
Belmont .....	145.48	1,875.00	1,200.00	204.07	422.37	116.00	170.19	.....	.....
Center Harbor...	89.31	930.00	200.00	63.60	151.98	38.00	54.90	.....	.....
Gilford.....	60.90	1,335.00	.....	99.50	300.00	90.00	76.86	.....	.....
Gilmanton.....	559.33	1,597.00	200.00	184.06	385.00	90.00	118.34	\$228.49	.....
Laconia.....	.....	15,397.50	8,230.20	.....	.....	.....	872.30	.....	.....
Meredith, town..	476.91	1,477.50	270.00	50.99	443.67	120.00	95.54	.....	186.67
Meredith, spec..	924.00	1,350.00	1,152.30	228.55	276.68	70.00	83.80	.....	140.00
New Hampton...	546.86	1,117.50	200.00	115.00	826.65	100.00	105.53	100.29	.....
Sanbornton.....	270.94	1,552.50	.....	60.01	531.07	115.00	100.04	.....	.....
Tilton, town....	638.78	1,629.15	650.00	130.42	*1,176.64	75.00	76.86	.....	183.34
Tilton, Union....	727.64	2,458.35	3,415.36	500.00	.....	10.00	223.26	.....	.....
Total.....	\$1,742.94	\$34,567.00	\$17,567.86	\$2,011.20	\$5,018.34	\$1,042.00	\$2,205.76	\$328.78	\$793.34

\* Both districts.

## BELKNAP COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
		\$297.65	\$60.31	\$5,260.88				\$500.00		\$5,760.88
\$104.88	\$138.19	232.80	4.37	3,386.27				150.00		3,536.27
130.48		193.88		4,457.47						4,457.47
		115.00		1,642.79						1,642.79
18.72		137.14	2.25	2,120.37				300.00		2,420.37
96.12		101.80		3,560.14				200.00		3,760.14
			834.95	25,334.95						25,334.95
195.60	50.00			3,366.88				450.00		3,816.88
64.48		82.72		4,372.62				350.00		4,722.62
388.28		120.20	5.00	3,625.31				250.00		3,875.31
85.12	77.71	158.05		2,950.44				100.00		3,050.44
*467.80	37.26	84.86	42.31	5,192.42				175.00		5,367.42
	183.86	227.56		7,746.03						7,746.03
\$1,551.48	\$487.02	\$1,751.66	\$949.19	\$73,016.57				\$2,475.00		\$75,491.57

TABLE No. VI.—

(For the year ending

EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Tenant officers.	Transportation of pupils.
Alton .....	\$215.35	\$10.00	\$150.00	\$3,158.41	\$583.33	.....	\$70.00	\$3 75	\$234.80
Barnstead .....	102.44	.....	34.33	2,280.00	.....	\$475.68	125.00	20.00	148.30
Belmont .....	142.98	.....	61.09	2,879.25	.....	422.37	91.00	25.00	185.70
Center Harbor .....	.....	.....	63.60	1,025.25	.....	151.98	35.00	3.00	70.00
Gilford .....	87.50	12.00	.....	1,416.25	.....	263.33	75.00	10.00	82.80
Gilmanton .....	144.77	22.00	17.29	2,118.00	.....	385.00	90.00	.....	193.82
Laconia .....	654.31	200.43	610.55	16,073.64	1,300.00	.....	90.00	360.00	696.80
Meredith, town .....	24.74	.....	26.25	1,541.40	373.74	443.67	120.00	.....	159.75
Meredith, spec. ....	153.55	.....	75.00	1,800.25	280.00	276.68	60.00	10.00	.....
New Hampton .....	75.00	.....	40.00	1,262.00	.....	826.65	90.00	10.00	48.00
Sanbornton .....	36.84	.....	23.42	1,497.80	.....	531.07	115.00	.....	102.00
Tilton, town .....	120.00	.....	10.42	926.00	275.00	* 1,440.00	70.00	5.00	.....
Tilton, Union .....	179.43	17.00	318.29	3,977.87	.....	.....	.....	10.00	.....
Total .....	\$1,936.91	\$261.43	\$1,430.24	\$39,965.12	\$2,812.07	\$5,216.43	\$1,031.00	\$456.75	\$1,921.97

\* Both districts.

## BELKNAP COUNTY.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	† Rate of school assessment.	Average of current expenditure per pupil.
		\$174.93	\$228.73	\$215.99	\$5,045.29			\$355.44	\$5,400.73	\$5.34	\$29.68
\$7.00			143.60	56.05	3,392.40			90.18	3,482.58	4.62	18.74
101.10		68.60	183.29	86.53	4,246.91				4,246.91	6.22	18.66
		28.45	60.00	56.84	1,494.12				1,494.12	3.41	22.64
13.46			58.55	86.51	2,105.40			258.65	2,364.05	3.93	19.14
		14.50	99.42	15.00	3,099.80			203.76	3,303.56	4.22	20.95
467.10	\$250.00	1,256.00	2,183.85	1,192.27	25,334.95				25,334.95	5.26	26.36
		14.25	65.60	49.11	2,818.51			450.00	3,268.51	4.66	27.63
208.86		140.00	150.13		3,163.47			150.00	3,313.47	4.64	24.91
			50.00	30.00	2,431.65			300.00	2,731.65	4.05	19.77
			138.00		2,444.13			86.21	2,530.34	3.52	18.66
	16.20	37.88	70.10	63.59	3,034.19	\$500.00	\$15.25	170.25	3,719.69	4.29	36.12
72.33		363.62	421.33	207.13	5,567.00		600.00		6,167.00	5.10	17.56
\$869.85	\$266.20	\$2,098.23	\$3,852.60	\$2,059.02	\$64,177.82	\$500.00	\$615.25	\$2,064.49	\$67,357.56	\$4.55	\$23.33

† On one thousand dollars of inventoried valuation.

TABLE No. I.—CARROLL COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Albany .....	3	.....	2	.....	25	22	23.00
Bartlett, town district .....	5	.....	3	.....	30	28	29.60
Bartlett, special district .....	4	4	.....	.....	32	32	32.00
Brookfield .....	3	.....	1	.....	26	24	25.33
Chatham .....	4	.....	2	2	28	18	24.00
Conway .....	19	13	.....	1	35	31	33.22
Eaton .....	7	.....	1	1	21	*10	21.00
Effingham .....	7	.....	2	.....	30	24	26.17
Freedom .....	3	.....	.....	.....	33	33	33.00
Hart's Location † .....	.....	.....	.....	.....	.....	.....	.....
Jackson, town district .....	5	.....	3	2	30	24	27.00
Jackson, special district .....	2	.....	.....	.....	30	30	30.00
Madison .....	6	.....	3	1	24	24	24.00
Moultonborough .....	8	.....	3	.....	24	23	23.25
Ossipee .....	10	.....	4	.....	37	29	34.82
Sandwich .....	8	.....	3	.....	27	21	24.37
Tamworth .....	10	.....	2	3	23	23	23.00
Tuftonborough .....	5	.....	2	.....	31	28	29.80
Wakefield .....	12	7	.....	.....	33	33	33.00
Wolfeboro .....	14	8	4	2	36	35	35.71
Total .....	135	32	35	12	.....	.....	29.04

\* Scholars conveyed.

† No school maintained during year.



TABLE No. II.—CARROLL COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Albany .....	4			4	\$3,000.00	\$500.00
Bartlett, town district...	6			6	3,500.00	500.00
Bartlett, special district.	1			4	5,800.00	150.00
Brookfield .....	3			3	1,600.00	75.00
Chatham .....	5			5	3,000.00	75.00
Conway .....	15			23	20,000.00	200.00
Eaton .....	7			7	5,000.00	100.00
Effingham .....	7			7	4,000.00	100.00
Freedom .....	4			5	3,000.00	100.00
Hart's Location .....						
Jackson, town district...	5			5	3,600.00	40.00
Jackson, special district.	1			2	1,500.00	75.00
Madison .....	6			6	2,000.00	300.00
Moultonborough .....	8			8	3,500.00	50.00
Ossipee .....	12			12	15,000.00	300.00
Sandwich .....	8			9	3,800.00	100.00
Tamworth .....	11		1	12	7,000.00	100.00
Tuftonborough .....	5			5	6,000.00	25.00
Wakefield .....	12	1		15	12,500.00	500.00
Wolfeboro .....	10			15	15,700.00	50.00
Total .....	130	1	1	153	\$119,300.00	\$3,340.00

TABLE No. III.—CARROLL COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Albany .....	25	17	30	33	2	59	2				36	33	91			
Bartlett, town .....	75	50	51	59	...	109	1				71	52	75			
Bartlett, special .....	76	83	80	83	...	159	4		1		144	133	94	4		
Brookfield .....	25	17	26	26	1	51	...				35	30	86			2
Chatham .....	10	25	11	19		29	1				30	29	96			
Conway .....	306	267	325	273	5	586	7		4		516	456	88			1
Eaton .....	35	37	45	41	5	79	2				75	62	82			
Effingham .....	72	35	69	39	1	106	1				97	86	88			
Freedom .....	45	31	44	27	4	63	4				71	63	88			
Hart's Location .....																
Jackson, town .....	13	19	20	24		43	1		1		42	36	88			
Jackson, special .....	20	37	21	36	1	56			2		49	47	93	3		
Madison .....	57	40	52	34		85	1		2		68	60	87			
Moultonborough .....	64	64	79	69		145	3			5	144	134	93			3
Ossipee .....	157	144	124	113	12	212	13		8		237	231	97			
Sandwich .....	53	46	64	61		122	3		2	14	99	87	88			
Tamworth .....	84	88	94	80	3	168	3			3	140	129	92			
Tuftonborough .....	38	35	45	42	1	84	2				64	53	90		4	
Wakefield .....	175	132	177	143	2	316	2		16		259	236	91			
Wolfeboro .....	150	157	137	132	1	268					227	205	90		71	1
Total .....	1,480	1,324	1,494	1,334	38	2,740	50		36	22	2,404	2,167	90	7	75	7

\* Between five and sixteen inclusive.

TABLE No. IV.—CARROLL COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Albany.....	1	\$28.00	5	\$28.00		3		1	
Bartlett, town.....	1	36.00	11	30.00	1				
Bartlett, special.....	1	52.00	3	38.00			2	12	
Brookfield.....			6	32.00		1			
Chatham.....			4	28.00		1	1	12	
Conway.....	1	52.00	29	35.50	1		4	12	12
Eaton.....	2	32.00	8	28.00		3			1
Effingham.....	3	28.00	10	28.00	3	4	1		1
Freedom.....	2	38.00	1	26.50					
Hart's Location.....									
Jackson, town.....			9	26.33	5	2	1	1	
Jackson, special.....			2	40.00					
Madison.....	2	32.00	6	30.00		1		1	
Moultonborough.....	1	28.00	7	29.00		5			
Ossipee.....	3	38.00	7	35.00	1	3			1
Sandwich.....	2	32.00	11	28.00	2		2	1	
Tamworth.....	2	35.00	15	31.00	8	2			1
Tuftonborough.....	1	36.00	7	34.00	3	1	1		1
Wakefield.....	1	60.00	15	35.80	2		5	2	2
Wolfeboro.....	2	56.00	12	35.67		3	5		
Total.....	25	\$37.20	168	\$31.89	26	29	22	12	9

TABLE No. V.—

(For the year ending

REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Albany.....	\$289.86	\$277.50	\$300.00	\$50.00		\$37.50	\$30.50		
Bartlett, town...	136.62	565.85	300.00	100.00		51.00	75.64	†\$575.91	
Bartlett, special.	163.59	491.65	700.00	50.00	\$36.00	10.00	89.67		
Brookfield.....	84.83	397.50	100.00	50.00		25.00	34.16		
Chatham.....	78.65	322.50	277.50	50.00		22.00	45.47	72.52	
Conway.....	49.76	3,157.50	3,000.00	633.18	12.63	215.00	359.90	1,136.93	
Eaton.....	146.13	330.00	460.00	125.00		44.75	46.36	121.31	
Effingham.....	184.58	637.50	300.00	100.00		61.00	65.27	145.45	
Freedom.....	230.14	667.50	250.00	68.77		45.00	45.75	60.29	
Hart's Location.									
Jackson, town...	325.46	651.50		41.05	40.01	25.00	30.00		
Jackson, special.	60.00	455.00	250.00	45.68	86.39	10.00	43.81		
Madison.....	108.37	570.00	700.00	125.13	24.00	70.00	53.68	92.80	
Moultonborough	62.04	1,185.00	315.00	61.28	183.51	70.00	95.77		
Ossipee.....	300.00	1,747.50	1,000.00	250.00	112.06	185.00	201.30	595.85	
Sandwich.....	346.99	1,312.50	350.00	100.00	396.07	105.00	76.86		
Tamworth.....	46.00	1,350.00	300.00	150.00	94.66	105.00	111.63	435.39	
Tuftonborough..	91.38	757.50	270.00	139.81		69.00	53.07		\$123.96
Wakefield.....	135.24	2,737.50	1,500.00	189.61	288.00	117.20	209.23	281.71	300.00
Wolfeboro.....	*3,084.56	3,787.50	535.92	258.46			167.14		442.71
Total.....	\$5,924.20	\$21,401.50	\$10,908.42	\$2,587.97	\$1,273.33	\$1,267.45	\$1,835.21	\$3,518.16	\$866.67

\* Accumulation of Brewster Fund.

† Both districts.

CARROLL COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
.....	.....	\$55.00	\$3.50	\$1,043.86	.....	.....	.....	.....	.....	\$1,043.86
.....	.....	78.00	.....	1,883.02	.....	.....	.....	.....	.....	1,883.02
\$7.52	.....	68.00	246.26	1,862.69	.....	.....	.....	.....	.....	1,862.69
.....	.....	59.00	.....	750.49	.....	.....	.....	.....	.....	750.49
.....	.....	35.90	.....	904.54	.....	.....	.....	\$200.00	.....	1,104.54
27.84	\$9.40	282.28	45.25	8,929.67	.....	.....	.....	400.00	\$50.00	9,379.67
.....	.....	64.30	77.33	1,415.18	.....	.....	.....	.....	.....	1,415.18
.....	16.00	78.80	38.57	1,627.17	.....	.....	.....	100.00	.....	1,727.17
.....	.....	79.80	.....	1,447.25	.....	.....	.....	.....	.....	1,447.25
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.64	18.50	46.75	90.95	1,263.86	.....	.....	.....	30.00	.....	1,293.86
.....	.....	42.78	36.00	1,029.66	.....	.....	.....	.....	.....	1,029.66
15.04	.....	96.30	.....	1,855.32	.....	.....	.....	50.00	.....	1,905.32
.....	.....	115.00	.....	2,087.60	.....	.....	.....	.....	.....	2,087.60
6.08	.....	153.90	42.50	4,594.19	.....	.....	.....	150.00	.....	4,744.19
.....	.....	152.67	.....	2,840.09	.....	.....	.....	.....	133.92	2,974.01
.....	72.00	162.90	.....	2,827.58	.....	.....	.....	.....	.....	2,827.58
.....	700.00	124.25	.....	2,328.97	.....	.....	.....	.....	.....	2,328.97
75.20	104.00	156.90	.....	6,094.59	.....	.....	.....	400.00	.....	6,494.59
.....	2,758.00	219.40	47.12	11,300.81	.....	.....	.....	600.00	1,550.28	13,451.09
\$136.32	\$3,667.90	\$2,071.93	\$627.48	\$56,086.54	.....	.....	.....	\$1,930.00	\$1,734.20	\$59,750.74

‡ Voted from Brewster Fund accumulation.

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Albany .....	\$34.25		\$17.91	\$483.00			\$37.50		\$128.00
Bartlett, town district...	43.87			692.50			51.00	\$10.00	75.00
Bartlett, special district.	48.00		100.43	1,321.50		\$36.00		10.00	
Brookfield .....	12.00	\$9.00	38.51	596.50			25.00		
Chatham .....	28.70		7.25	672.00			22.00		15.00
Conway .....	633.18			5,905.00		12.63	200.00	15.00	959.00
Eaton .....	59.32		6.44	1,012.00			44.75		51.00
Effingham .....	72.67		16.23	1,282.40			55.00	6.00	
Freedom .....	61.65		3.51	855.50			45.00		82.50
Hart's Location .....									
Jackson, town district...	24.99	10.50	5.56	856.00		40 01	25.00		
Jackson, special district.	39.68	6.00		600.00		86 39	10 00		
Madison .....	100.13		25.00	1,170.00		24.00	65.00	5.00	38.10
Moultonborough .....	61.28			1,375.50		183.51	70.00		175.25
Ossipee .....	222.00		155.91	2,626.00		112.06	160.00	25.00	97.00
Sandwich .....	36.86	8.00	29.07	1,327.60		396.07	105.00		105.25
Tamworth .....	150.00			1,977.00		94.66	105.00		87.50
Tuftonborough .....	107.09		32.72	1,303.00	\$204.16		60.00	9.00	458.75
Wakefield .....	120.00		69.61	3,658.50	600.00	288 00	109.20	8.00	358.70
Wolfeboro .....	153.19		105.27	4,705.05	468.76			25.00	226.50
Total .....	\$2,008.86	\$33.50	\$613.42	\$32,419.05	\$1,272.92	\$1,273.33	\$1,189.45	\$113.00	\$2,857.55

## CARROLL COUNTY.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
.....	.....	.....	\$14.00	\$30.25	\$744.91	.....	.....	.....	\$744.91	\$3.19	\$20.69
\$1.50	.....	\$11.00	17.00	15.21	917.08	.....	.....	.....	917.08	3.47	12.92
14.50	\$50.00	67.09	120.95	54.49	1,822.87	.....	.....	.....	1,822.87	6.86	12.66
.....	.....	2.75	25.00	.....	708.76	.....	.....	.....	708.76	3.57	20.25
13.25	.....	.....	30.00	27.00	815.20	.....	.....	\$200.00	1,015.20	4.35	27.14
.....	.....	277.23	475.21	169.21	8,646.46	.....	.....	534.96	9,181.42	6.11	16.76
2.00	.....	.....	27.53	18.10	1,221.14	.....	.....	70.41	1,291.55	5.27	16.28
43.37	.....	.....	57.13	4.53	1,537.33	.....	.....	.....	1,537.33	3.68	15.85
17.05	.....	.....	28.00	.....	1,093.21	.....	.....	.....	1,093.21	2.91	15.40
.....	.....	4.00	35.50	19.93	1,021.49	.....	.....	25.00	1,046.49	4.72	23.75
11.66	20.00	17.50	17.50	15.50	824.23	.....	.....	.....	824.23	2.55	16.82
15.00	.....	.....	48.00	150.00	1,640.23	.....	.....	.....	1,640.23	4.54	24.12
13.04	.....	.....	87.58	52.40	2,018.56	.....	.....	55.48	2,074.04	3.37	14.02
103.43	.....	14.75	233.01	.....	3,749.16	.....	.....	.....	3,749.16	4.53	15.82
.....	.....	.....	49.00	156.20	2,213.05	.....	\$133.92	361.81	2,708.78	3.61	19.24
17.10	17.50	5.00	396.25	.....	2,850.01	.....	27.00	.....	2,877.01	4.08	20.36
6.50	.....	48.80	39.72	29.51	2,299.25	.....	.....	.....	2,299.25	3.12	35.92
.....	.....	212.50	318.52	.....	5,743.03	.....	.....	354.26	6,097.29	6.85	22.17
97.31	103.95	467.50	610.36	137.10	7,099.99	.....	.....	2,150.28	9,250.27	4.09	25.82
\$355.71	\$191.45	\$1,128.03	\$2,630.26	\$879.43	\$46,965.96	.....	\$160.92	\$3,752.20	\$50,879.08	\$4.26	\$19.08

\* On one thousand dollars of inventoried valuation.



## TABLE No. I.—CHESHIRE COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Alstead .....	8	8	1	2	30	28	29.00
Chesterfield .....	7	4	1		25	*19	23.28
Dublin .....	4	4	3		35	34	34.75
Fitzwilliam .....	6	6			36	33	33.75
Gilsum .....	3	2			31	31	31.00
Harrisville .....	4	3		1	36	31	33.25
Hinsdale .....	10	7	1		36	34	34.40
Jaffrey .....	11	6	2		31	28	29.60
Keene .....	37	37	2		36	36	36.00
Marlborough .....	7	6			35	*10	35.00
Marlow .....	3				30	30	30.00
Nelson .....	2				28	26	27.00
Richmond .....	4			1	28	*12	27.66
Rindge .....	6	6	1		32	32	32.00
Roxbury (no schools) .....							
Stoddard .....	3		2	1	27	20	23.26
Sullivan .....	4		2		21	20	20.25
Surry .....	3			2	33	21	25.33
Swanzy .....	12	6			33	*12	29.00
Troy .....	4	4			36	34	35.50
Walpole .....	18	18			34	34	34.00
Westmoreland .....	5	5			33	31	32.00
Winchester .....	17	9	7		36	24	30.82
Total .....	178	131	22	7			30.80

\* One term.

## TABLE No. II.—CHESHIRE COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Alstead.....	9	1		11	\$4,500.00	\$400.00
Chesterfield.....	7	1		9	5,000.00	200.00
Dublin.....	5			5	5,400.00	250.00
Fitzwilliam.....	7	1		9	6,000.00	100.00
Gilsun.....	4			5	3,000.00	50.00
Harrisville.....	3			4	3,200.00	30.00
Hinsdale.....	5			13	14,000.00	1,000.00
Jaffrey.....	8			12	15,000.00	350.00
Keene.....	18			51	15,500.00	1,500.00
Marlborough.....	4			9	10,000.00	200.00
Marlow.....	6			7	1,800.00	100.00
Nelson.....	2			2	4,000.00	.....
Richmond.....	5			5	1,500.00	200.00
Rindge.....	3	1		9	6,700.00	250.00
Roxbury (no schools).....	*3			3	150.00	.....
Stoddard.....	3			3	2,000.00	100.00
Sullivan.....	5			5	3,000.00	60.00
Surry.....	4			4	1,200.00	100.00
Swanzey.....	8			13	12,500.00	400.00
Troy.....	4			8	14,000.00	250.00
Walpole.....	12	3		28	30,000.00	1,100.00
Westmoreland.....	11	2		12	5,000.00	300.00
Winchester.....	12			22	15,000.00	1,000.00
Total.....	153	9		249	\$178,450.00	\$7,940.00

\* All unused.

TABLE No. III.—CHESHIRE COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Alstead .....	70	46	87	64	..	135	16	..	..	..	120	108	90	..	2	..
Chesterfield .....	74	72	77	75	1	147	4	..	..	..	124	111	89	..	..	..
Dublin .....	29	36	31	39	..	70	..	..	9	..	43	38	89	2	1	..
Fitzwilliam .....	113	93	103	103	1	200	5	..	5	3	154	140	90	..	..	..
Gilsum .....	37	52	36	47	1	79	3	..	1	2	65	60	91	..	..	..
Harrisville .....	69	59	73	55	1	126	1	..	4	..	106	97	91	..	..	..
Hinsdale .....	139	181	164	198	..	342	20	..	..	..	307	272	88	..	..	..
Jaffrey .....	206	215	169	168	..	333	4	..	..	..	278	242	87	..	..	..
Keene .....	913	934	765	867	58	1,442	132	38	..	..	1,454	1,340	92	330	..	..
Marlborough .....	163	139	168	153	..	299	22	4	..	..	280	245	87	1	..	..
Marlow .....	50	39	41	33	1	73	..	2	..	..	55	49	89	..	..	..
Nelson .....	24	20	30	30	1	59	..	2	..	..	38	35	91	..	..	..
Richmond .....	41	36	48	36	1	79	4	..	1	..	76	70	92	..	..	..
Rindge .....	60	52	59	54	..	113	..	5	1	..	88	79	90	1	..	..
Roxbury .....	4	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stoddard .....	33	30	35	35	1	67	2	..	..	..	52	47	90	..	..	..
Sullivan .....	28	23	40	25	..	60	5	..	3	..	51	47	92	..	..	..
Surry .....	16	12	20	12	..	30	2	..	4	..	26	23	88	..	..	..
Swanzy .....	145	155	171	161	6	321	5	..	22	1	299	255	86	..	..	..
Troy .....	121	136	120	133	..	244	9	1	..	..	224	210	93	..	..	..
Walpole .....	301	359	387	356	30	669	44	4	..	..	623	571	91	..	5	1
Westmoreland .....	58	52	69	67	..	132	4	..	..	..	105	96	91	..	..	..
Winchester .....	229	219	279	248	11	497	19	2	..	..	402	365	90	..	..	..
Total .....	2,913	2,963	2,972	2,959	113	5,517	301	49	59	7	4,970	4,500	90	334	8	1

\* Between five and sixteen inclusive.

† No schools.

TABLE No. IV.—CHESHIRE COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Alstead.....			11	\$31.00		2	1		2
Chesterfield.....	1	\$40.00	10	34.00	2		1	1	1
Dublin.....			5	39.67			4	1	1
Fitzwilliam.....			9	36.22	1		2		
Gilsum.....			4	32.00		1			
Harrisville.....			8	37.33	3	1	1	1	1
Hinsdale.....			10	32.40	3		1		
Jaffrey.....			14	36.00	1		2	1	
Keene.....			42	40.87	2		9	2	1
Marlborough.....			6	36.00	2	1	1		
Marlow.....			5	34.90		1			
Nelson.....			3	34.00	1		1	1	
Richmond.....			6	33.40	1	1			
Rindge.....	1	32.00	7	32.22	4	1			
Roxbury (no schools)									
Stoddard.....			5	30.66	1	4			
Sullivan.....			5	28.50	3	1		2	
Surry.....			6	28.00	2	2	1		
Swanzy.....	1	52.00	12	31.66	1			2	
Troy.....			4	37.00					
Walpole.....	1	94.12	21	39.00	1		9	4	2
Westmoreland.....			7	40.00			1	1	1
Winchester.....			17	33.88	2	1	1	1	
Total.....	4	\$54.53	217	\$35.76	30	16	35	17	9

TABLE No. V.—

(For the year ending

REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Alstead		\$1,327.50	\$308.86	\$100.00		\$67.00	\$93.94		\$137.50
Chesterfield	\$116.80	1,717.50		100.00		112.00	90.89		
Dublin	1,401.41	2,400.00		142.94	\$223.30	110.45	41.48		100.00
Fitzwilliam	193.47	1,432.50	967.50	200.00	100.00	55.50	126.88	\$205.07	130.00
Gilsum	96.18	660.00	240.00	50.00		50.34	42.09		
Harrisville	45.74	1,035.00	365.00		67.00	71.00	90.89		100.00
Hinsdale	743.01	2,775.00	4,088.43	600.00		175.00	233.63		
Jaffrey		3,112.50	1,000.00	200.00		88.40	235.46		
Keene	1,505.01	20,302.50	11,983.00	3,500.00		240.00	930.25		
Marlborough	233.24	2,227.50	1,256.00	300.00		140.00	186.66		
Marlow	184.23	750.00	50.00	54.66		65.00	54.90		
Nelson		405.00	145.00	41.25	66.00	28.00	21.35		
Richmond	134.04	817.50	400.00	100.00	30.00	78.75	64.66	100.02	
Rindge	224.83	1,792.50	257.50	148.76	136.00	66.00	65.27		115.00
Roxbury	274.32								
Stoddard	280.95	510.00	50.00			41.00	39.65		
Sullivan	181.23	382.50	217.50	68.30	100.00	56.49	40.87	117.17	
Surry	.74	510.00		21.33	110.00	25.00	31.72		
Swanzey		2,167.50	1,132.50	300.00	675.00	150.00	220.21		175.00
Troy	32.93	1,597.50	1,275.00	300.00	50.00	141.15	145.18	388.96	130.00
Walpole	1,000.47	4,657.50	8,612.50	1,000.00			448.96	1,241.22	275.00
Westmoreland	258.76	1,417.50		177.78			91.50		137.50
Winchester	1,425.74	3,157.50	4,542.50	857.08		450.00	290.97		
Total	\$8,342.10	\$55,155.00	\$36,891.29	\$8,262.10	\$1,557.30	\$2,211.08	\$3,587.41	\$2,052.44	\$1,300.00

## CHESHIRE COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
.....	\$142.88	\$57.30	\$274.85	\$2,509.83	.....	.....	.....	.....	.....	\$2,509.83
.....	.....	206.00	.....	2,343.19	.....	.....	.....	.....	.....	2,343.19
.....	409.34	176.80	7.24	5,012.96	.....	.....	.....	.....	.....	5,012.96
\$5.28	.....	199.40	363.89	3,979.49	.....	.....	.....	\$200.00	.....	4,179.49
12.48	18.00	85.50	6.30	1,261.29	.....	.....	.....	50.00	.....	1,311.29
.....	24.08	117.00	26.00	1,941.71	.....	.....	\$1,200.00	.....	.....	3,141.71
.....	.....	452.41	20.40	9,087.88	.....	.....	.....	.....	.....	9,087.88
.....	52.71	203.04	.....	4,892.11	.....	.....	2,500.00	.....	.....	7,392.11
.....	.....	973.13	1,208.06	49,641.95	.....	.....	3,100.00	2,000.00	.....	45,741.95
.....	482.72	.....	78.69	4,904.81	.....	.....	.....	100.00	\$250.00	5,254.81
.....	87.15	72.30	21.85	1,340.09	.....	.....	.....	.....	30.00	1,370.09
.....	.....	73.00	2.00	781.60	.....	.....	.....	.....	.....	781.60
.....	.....	87.09	.....	1,812.06	.....	.....	.....	50.00	.....	1,862.06
.....	.....	.....	.....	2,805.86	.....	.....	.....	50.00	.....	2,855.86
.....	.....	.....	.....	274.32	.....	.....	.....	.....	.....	274.32
.....	.....	50.40	.....	981.00	.....	.....	.....	.....	.....	981.00
8.32	.....	38.40	65.50	1,276.28	.....	.....	.....	.....	.....	1,276.28
.....	16.78	69.34	26.00	810.91	.....	.....	.....	.....	.....	810.91
.....	.....	230.58	.....	5,050.79	.....	.....	.....	.....	.....	5,050.79
.....	24.00	195.00	150.05	4,429.77	.....	.....	.....	200.00	.....	4,629.77
.....	.....	291.30	178.20	17,705.15	.....	.....	.....	.....	.....	17,705.15
.....	184.33	172.10	563.88	3,003.35	.....	.....	.....	.....	.....	3,003.35
.....	.....	243.90	120.55	11,088.24	.....	.....	.....	150.00	.....	11,238.24
\$26.08	\$1,441.99	\$3,994.39	\$3,113.46	\$127,934.64	.....	.....	\$6,800.00	\$2,800.00	\$280.00	\$137,814.64

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Trauant officer.	Transportation of pupils.
Alstead.....	\$25.00		\$75.00	\$1,766.00	\$297.92		\$67.00		\$170.00
Chesterfield.....	40.00		30.00	1,142.00			100.00	\$12.00	433.50
Dublin.....	89.74		53.20	1,635.00	169.45	\$223.30	110.45		95.10
Fitzwilliam.....	122.27	\$10.00	66.97	2,015.00	266.39	168.00	50.00	5.00	486.47
Gilsum.....	60.37		4.39	744.00			49.74	.60	194.75
Harrisville.....	51.87		62.51	1,034.00	100.00	67.00	71.00		
Hinsdale.....	429.21	80.02	156.39	5,009.66			175.00	10.00	160.90
Jaffrey.....	104.33		95.57	3,113.50			82.40	6.00	161.00
Keene.....	1,500.00	50.00	2,000.00	20,994.00	1,200.00		240.00		529.60
Marlborough.....	299.12	36.90		3,143.64			130.00	10.00	379.97
Marlow.....	34.94		19.72	760.50			65.00		208.99
Nelson.....	32.47		8.78	460.00		66.00	28.00		38.36
Richmond.....	10.88		27.59	858.00		30.00	72.75	6.00	229.75
Rindge.....	91.07		57.69	1,527.00	244.63	136.00	66.40	.50	272.45
Roxbury.....							16.00		133.50
Stoddard.....	5.40		48.61	519.25			40.00	1.00	64.04
Sullivan.....			68.30	603.00		100.00	56.49		125.15
Surry.....	10.00		11.33	520.00		110.00	25.00		50.00
Swanzey.....	290.22	6.05	95.55	3,144.00	202.50	675.00	150.00		171.01
Troy.....	242.84	9.25	55.64	2,415.00	263.06	50.00	135.00	6.15	598.00
Walpole.....	584.92	107.00	373.00	7,642.56	549.96	785.39			1,995.25
Westmoreland.....	98.00		79.78	1,530.00	275.00				325.50
Winchester.....	857.08			5,869.17			444.09	6.00	515.80
Total.....	\$4,979.73	\$299.22	\$3,390.62	\$66,451.28	\$3,568.91	\$2,410.09	\$2,174.32	\$63.25	\$7,339.00



## CHESHIRE COUNTY.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$10.00		\$22.00	\$94.00		\$2,526.92			\$58.00	\$2,584.92	\$2.96	\$21.05
5 00		35.75	54.00		1,852.25				1,852.25	3.28	14.93
699.71		75.35	83.25	\$193.78	3,428.33				3,428.33	2.60	65.77
124.99		59.30	94.79	129.07	3,598.25			232.70	3,830.95	4.88	22.21
9.89	\$6 80	30.85	58.81	41.97	1,202.17				1,202.17	3.83	17.67
18.53		55.40	116.63	18.20	1,595.14			1,282.00	2,877.14	3.13	14.50
183.75	105.00	437.50	641.97	1,089.97	8,479.97			384.07	8,864.04	7.06	27.62
81.83	103.00	273.50	154.92	304.02	4,480.07	\$2,500.00		231.73	7,211.80	5.53	16.11
	92.50	2,634.91	2,805.50	2,468.19	34,514.70	4,252.00	\$434.00	2,616.90	41,817.60	5.10	23.74
121.79	16 00	234.40	223 00	102.16	4,702.98			250.00	4,952.98	4.41	16.79
4.07		28.25	31.25	7.52	1,160.24			25.05	1,185.29	3.05	20.36
		11.50	42.50	10.18	697.79				697.79	2.46	17.44
67.62		42 50	76 00	21.48	1,442.57				1,442.57	3.83	18.98
77.24		56.30	97.35	1.33	2,627.96			50.00	2,677.96	4.03	27.95
				62.75	213.25				213.25		
		6.75	10.25	12.04	707.34			60.00	767.34	3.37	13.60
		14.25	23.75	23.99	1,014.93				1,014.93	4.00	18.79
		16.50	39.56	6.00	788.39				788.39	2.57	26.28
25.11		98.80	298.71	191.12	5,348.07				5,348.07	3.60	16.60
145.50		245.55	217.15	46.54	4,429.77			200.00	4,629.77	4.82	19.33
200.05	214.25	650.75	1,227.30	351.98	14,682.41		1,676.71	300.00	16,659.12	7.65	23.41
30.00		40.00	70.00	185.50	2,633.78				2,633.78	3.51	25.08
236.62		259.03	465.76	188.62	8,842.17			49.40	8,891.57	5.96	21.99
\$2,041.79	\$537.55	\$5,329.14	\$6,926.45	\$5,457.41	\$110,969.45	\$6,752.00	\$2,110.71	\$5,739.85	\$125,572.01	\$4.16	\$22.33

\* On one thousand dollars of inventoried valuation.

## TABLE No. I.—COOS COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Berlin.....	21	20	12	37	37	37	37.00
Carroll.....	6	12	12	31	30	30	30.50
Clarksville.....	6	3	3	25	22	23	23.33
Colebrook, town district.....	11	3	1	32	22	30	30.93
Colebrook, special district.....	4	36	36	36	36	36	36.00
Columbia.....	10	3	38	22	29	29	29.10
Dalton.....	6	28	28	28	28	28	28.00
Dummer.....	4	23	21	22	22	22	22.25
Errol.....	3	32	29	30	30	30	30.33
Gorham.....	14	8	35	26	31	31	31.21
Jefferson.....	8	2	29	25	28	28	28.50
Lancaster, town district.....	11	3	31	30	30	30	30.82
Lancaster, special district.....	8	8	35	35	35	35	35.00
Milan.....	8	4	33	30	31	31	31.50
Northumberland.....	10	8	2	35	25	34	34.00
Pittsburg.....	9	2	4	30	24	26	26.44
Randolph.....	2	1	24	24	24	24	24.00
Shelburne.....	3	1	28	28	28	28	28.00
Stark.....	6	1	32	26	30	30	30.50
Stewartstown, town district.....	12	5	3	25	22	22	22.66
Stewartstown *.....	2	2	36	36	36	36	36.00
Stratford.....	9	36	36	36	36	36	36.00
Wentworth's Location.....	1	30	30	30	30	30	30.00
Whitefield, town district.....	6	5	34	28	30	30	30.18
Whitefield, special district.....	8	8	36	36	36	36	36.00
Total.....	188	60	36	15	.....	.....	31.00

\* West Stewartstown district.

TABLE No. II.—COOS COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Berlin .....	6			23	\$50,529.59	\$4,939.00
Carroll .....	6			8	7,300.00	300.00
Clarksville .....	6			6	2,000.00	100.00
Colebrook, town district.	12			12	10,000.00	600.00
Colebrook, special dist.	2			8	14,000.00	650.00
Columbia .....	10	1		10	4,000.00	.....
Dalton .....	6			6	2,500.00	.....
Dummer .....	5		1	5	2,700.00	200.00
Errol .....	3			4	2,000.00	100.00
Gorham .....	7			18	20,000.00	500.00
Jefferson .....	9	1		12	10,000.00	.....
Lancaster, town district.	11			11	8,800.00	225.00
Lancaster, special dist.	2			14	15,000.00	750.00
Milan .....	7			9	6,000.00	150.00
Northumberland .....	9	2		12	7,500.00	.....
Pittsburg .....	8			9	4,400.00	360.00
Randolph .....	2			2	1,000.00	50.00
Shelburne .....	4			4	1,500.00	30.00
Stark .....	7	1		8	3,500.00	400.00
Stewartstown, town dist.	12			12	6,000.00	100.00
Stewartstown *	1			2	2,000.00	.....
Stratford .....	10	1		14	19,500.00	1,000.00
Wentworth's Location ..	1			1	600.00	10.00
Whitefield, town district	6			6	1,900.00	100.00
Whitefield, special dist.	1			9	22,000.00	100.00
Total.....	153	6	1	225	\$224,729.59	\$10,664.00

\* West Stewartstown district.

TABLE No. III.—COOS COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Berlin.....	1,244	1,131	611	519	2	1,023	105	8			974	886	90	1,400		
Carroll.....	59	55	49	51		100			1		100	88	88			
Clarksville.....	43	28	42	25	1	63	3				55	46	84			
Colebrook, town..	80	75	102	84		183	3			39	175	167	95			
Colebrook, special.	84	91	122	142		236	28	30			183	174	94			
Columbia.....	63	64	66	70	1	132	3		12		107	97	87			
Dalton.....	58	53	48	52	3	96	1			4	95	70	74			4
Dummer.....	29	25	28	27		51	4		1		49	44	89			
Errol.....	26	17	19	20		38	1				27	24	89			1
Gorham.....	199	219	249	234		469	14				441	406	89	8		
Jefferson.....	95	97	92	96		170	18		1		156	139	88			
Lancaster, town..	111	88	116	93		206	3		20		172	145	84			
Lancaster, special.	178	167	224	223		410	37	18			422	392	92			
Milan.....	90	84	97	96	3	185	5		8		149	126	86			3
Northumberland..	177	176	212	198	1	392	17		3	2	308	272	88			
Pittsburg.....	67	58	92	66		146	12				129	104	80			
Randolph.....	14	13	12	15		27					27	21	79			
Shelburne.....	25	23	27	23		49	1				50	42	84			
Stark.....	56	68	88	71	5	149	5		1	1	105	95	90			1
Stewartstown †.....	53	50	68	62		129	1		4		130	98	75			
Stewartstown ‡.....	36	38	48	41		89			1		72	66	91			
Stratford.....	169	178	154	169		313	10	8			324	299	92			
Wentworth's Loc'n	11	6	14	8		21	1				15	11	73			
Whitefield, town..	32	36	33	41		73	1		5	1	56	47	83			
Whitefield, special	141	133	178	183		326	35	15			315	287	91			
Total.....	3,140	2,973	2,791	2,609	16	5,076	308	79	57	47	4,636	4,146	89	1,408		9

\* Between five and sixteen inclusive.

† Town district.

‡ West Stewartstown district.

TABLE No. IV.—COOS COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Berlin .....			24	\$47.77	12		18		
Carroll .....	1	\$36.00	9	33.32	3	1			
Clarksville .....	3	26.00	7	26.00	1	9			
Colebrook, town .....	2	27.00	9	21.00	12	6	12	12	1
Colebrook, special .....			4	45.50			4	3	
Columbia .....			19	27.00	12	9			
Dalton .....			8	28.00	12				
Dummer .....	1	31.00	4	31.00		2			
Errol .....			5	20.00	3	3			
Gorham .....			14	31.00	4		1	1	1
Jefferson .....			8	28.44	12	2		1	
Lancaster, town .....			18	29.58	3	4	3	1	
Lancaster, special .....			8	51.50			5		
Milan .....			11	33.79	1	3		1	
Northumberland .....			12	36.00			1	1	1
Pittsburg .....	2	36.00	15	28.00		15			
Randolph .....			2	30.00	1	2			
Shelburne .....			3	32.00			1		
Stark .....			9	22.90	1	1			
Stewartstown* .....	1	29.00	11	15.55	5	9			
Stewartstown† .....			2	44.00	12				
Stratford .....			8	42.00	1		2	6	2
Wentworth's Loc'n .....	1	48.00	1	32.00					1
Whitefield, town .....	1	29.00	10	28.45	1		1		1
Whitefield, special .....			9	39.00		2	4	1	
Total .....	12	\$31.42	230	\$31.45	36	68	42	17	7

\* Town district.

† West Stewartstown district.

TABLE No. V.—  
(For the year ending  
REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Berlin .....		\$9,255.00	\$15,745.00	\$1,953.78		\$659.84	\$663.68		
Carroll .....	\$310.83	1,725.00		250.00	\$33.00	74.00	67.10		
Clarksville .....	261.00	412.50	100.00	50.00		25.00	73.20	\$246.34	
Colebrook, town .....	851.08	813.92	600.00	200.00	350.00	136.00	127.38	259.00	
Colebrook, special .....	783.18	1,953.58	2,038.41	200.00		50.00	154.44	382.63	\$187.50
Columbia .....	133.00	952.50	547.50	133.26	42.00	65.00	87.84	250.32	187.50
Dalton .....	68.48	480.00	520.00	77.43	108.62	80.00	71.37	201.79	
Dummer .....	174.79	420.00	180.00	18.75	30.00	30.00	32.94		
Errol .....	607.10	532.50	167.50		14.00	50.10	25.01		
Gorham .....		1,815.00	6,785.00	517.85		126.00	290.97	858.41	
Jefferson .....		1,417.50	2,582.50	190.38		125.50	134.81	282.72	
Lancaster, town .....	306.05	1,948.45	249.36	354.91	493.00	130.00	143.48		
Lancaster, special .....	443.74	3,601.55	4,578.29	975.47			265.22		
Milan .....	180.68	1,162.50	1,137.50	200.00	86.60	118.00	131.15	362.20	
Northumberland .....	652.77	2,460.00	2,975.00	400.00	149.00	117.00	247.05	607.03	187.50
Pittsburg .....	372.99	1,852.50	200.00	226.24		60.00	89.67		
Randolph .....	212.80	285.00	100.00	29.89		7.00	15.86		
Shelburne .....	25.90	480.00		22.23		20.00	30.50		
Stark .....	164.51	907.50	300.00	110.00	18.00	81.62	89.67	244.68	
Stewartstown * .....	829.91	740.00	541.34	54.72	120.00	116.60	95.16	344.94	
Stewartstown † .....		475.00	650.00	125.66		37.00	68.32	191.60	
Stratford .....	253.44	1,440.00	2,600.00	500.00		70.00	196.42	1,075.03	187.50
Wentworth's L'n .....	153.14	157.50	192.50	2.97		5.00	20.74		
Whitefield, town .....	306.00	729.10		138.50	163.08	85.00	76.60	208.66	
Whitefield, spec. .....	39.24	1,648.40	3,183.91	500.00			181.43	494.21	
Total .....	\$7,135.63	\$37,665.00	\$45,973.81	\$7,232.04	\$1,607.30	\$2,268.66	\$3,380.01	\$6,009.56	\$750.00

\* Town district.

† West Stewartstown district.



COOS COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
.....	.....	\$609.90	\$3,513.76	\$32,400.96	.....	.....	.....	.....	.....	\$32,400.96
.....	.....	40.00	.....	2,499.93	.....	.....	.....	\$500.00	.....	2,999.93
.....	.....	60.00	.....	1,228.04	.....	.....	.....	.....	.....	1,228.04
.....	.....	212.37	.....	3,549.75	.....	.....	.....	200.00	.....	3,749.75
.....	.....	592.91	638.47	6,981.12	\$1,700.00	.....	.....	250.00	.....	8,931.12
.....	.....	89.94	67.37	2,556.23	.....	.....	.....	.....	.....	2,556.23
\$81.08	.....	123.87	.....	1,812.64	.....	.....	.....	.....	.....	1,812.64
.....	.....	43.60	85.30	1,015.38	600.00	.....	.....	100.00	.....	1,715.38
.....	.....	.....	.....	1,396.21	.....	.....	.....	.....	.....	1,396.21
.....	.....	178.18	233.00	10,804.41	.....	.....	.....	.....	.....	10,804.41
.....	.....	87.00	.....	4,820.41	.....	.....	.....	.....	.....	4,820.41
187.76	\$76.88	62.02	1.49	3,953.40	.....	.....	.....	100.00	.....	4,053.40
.....	142.12	114.63	533.35	10,654.37	.....	\$1,000.00	.....	.....	.....	11,654.37
35.20	.....	141.40	.....	3,555.23	.....	.....	.....	100.00	.....	3,655.23
40.00	.....	200.02	.....	8,035.37	.....	.....	.....	300.00	.....	8,335.37
.....	.....	.....	.....	2,801.40	.....	.....	.....	200.00	.....	3,001.40
.....	.....	27.36	42.25	720.16	.....	.....	.....	.....	.....	720.16
.....	.....	35.23	.....	613.86	.....	.....	.....	.....	.....	613.86
.....	.....	84.30	143.42	2,143.70	.....	.....	.....	100.00	.....	2,243.70
17.12	.....	.....	.....	2,859.79	.....	.....	.....	50.00	.....	2,909.79
15.70	.....	.....	.....	1,563.28	.....	.....	.....	.....	.....	1,563.28
.....	.....	.....	.....	6,339.89	.....	.....	.....	1,200.00	.....	7,527.37
.....	.....	.....	.....	531.85	.....	.....	.....	50.00	.....	581.85
.....	1.82	57.20	100.00	1,865.96	.....	.....	.....	36.92	.....	1,902.88
.....	.....	131.55	1,189.02	7,367.76	.....	.....	.....	.....	.....	7,367.76
\$376.86	\$220.82	\$2,891.48	\$6,547.43	\$122,071.10	\$2,300.00	.....	\$1,000.00	\$3,186.92	...	\$128,545.52



TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Traut officers.	Transportation of pupils.
Berlin.....	\$906.66	\$245.55	\$801.57	\$15,761.80	\$1,800.00	.....	\$204.17	\$455.67	\$275.00
Carroll.....	93.82	16.00	30.46	1,563.05	.....	\$33.00	65.00	9.00	21.00
Clarks ville.....	50.00	.....	.....	922.00	.....	.....	25.00	.....	.....
Colebrook, town.....	200.00	.....	50.00	2,501.70	.....	350.00	121.00	15.00	.....
Colebrook, special.....	400.00	152.74	79.69	3,727.43	375.00	.....	.....	50.00	.....
Columbia.....	36.86	14.00	82.40	1,434.52	375.00	42.00	65.00	.....	.....
Dalton.....	51.32	.....	26.11	1,089.00	.....	108.62	75.00	5.00	.....
Dummer.....	8.00	.....	10.75	691.50	.....	30.00	30.00	.....	34.00
Errol.....	13.75	.....	5.40	445.00	.....	14.00	50.10	.....	.....
Gorham.....	517.85	.....	.....	5,781.50	.....	.....	70.00	56.00	308.00
Jefferson.....	162.18	.....	28.20	2,624.30	.....	.....	115.00	10.50	241.00
Lancaster, town.....	168.86	.....	77.18	2,306.50	.....	493.00	125.00	5.00	10.00
Lancaster, special.....	456.19	67.09	367.64	7,021.07	.....	.....	.....	5.00	.....
Milan.....	228.10	.....	40.00	2,100.54	.....	86.60	115.00	3.00	58.50
Northumberland.....	313.58	6.00	84.00	4,485.65	375.00	149.00	92.00	25.00	723.00
Pittsburg.....	.....	.....	226.24	1,652.00	.....	.....	95.00	15.00	45.00
Randolph.....	20.89	4.00	5.00	360.00	.....	.....	7.00	.....	.....
Shelburne.....	22.23	.....	.....	672.00	.....	.....	20.00	.....	150.00
Stark.....	65.00	.....	45.46	1,050.00	.....	18.00	71.00	10.62	45.00
Stewartstown *.....	38.29	.....	16.43	1,151.00	.....	120.00	103.00	13.60	37.50
Stewartstown †.....	83.37	.....	42.29	792.00	.....	.....	32.00	5.00	335.90
Stratford.....	251.00	50.00	190.00	4,033.63	375.00	.....	60.00	10.00	759.50
Wentworth's L'e'n.....	.....	.....	2.97	283.00	.....	.....	5.00	.....	.....
Whitefield, town.....	119.13	.....	19.37	1,327.00	.....	163.08	75.00	10.00	10.00
Whitefield, special.....	262.92	132.72	127.50	4,970.00	.....	.....	.....	.....	.....
Total.....	\$4,470.00	\$688.10	\$2,358.66	\$68,746.19	\$3,300.00	\$1,607.30	\$1,620.27	\$703.39	\$3,053.40

\* Town district.

† West Stewartstown district.

## COOS COUNTY.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	Rate of school assessment.	Average of current expenditure per pupil.
.....	.....	\$1,669.35	\$2,605.46	\$834.39	\$25,559.62	\$790.18	.....	\$3,311.83	\$29,661.63	\$4.74	\$26.25
.....	.....	53.90	182.60	53.05	2,120.88	.....	.....	493.32	2,614.20	3.29	20.99
.....	.....	10.00	69.00	9.00	1,085.00	.....	.....	.....	1,085.00	4.13	19.73
.....	.....	.....	220.00	.....	3,457.70	.....	.....	245.00	3,702.70	5.11	16.16
\$91.96	.....	216.00	381.51	498.08	5,972.44	1,700.00	\$272.19	225.00	8,169.60	5.87	32.67
13.50	.....	37.50	88.67	21.65	2,211.10	.....	.....	.....	2,211.10	6.41	17.00
.....	.....	4.00	92.00	40.00	1,491.05	.....	.....	12.85	1,503.90	5.85	15.06
4.67	.....	14.95	36.52	38.60	898.99	718.42	.....	.....	1,617.41	4.73	17.98
.....	.....	8.50	38.00	262.00	836.75	.....	.....	.....	836.75	3.14	30.99
73.75	\$87.75	504.75	557.72	331.06	8,378.38	.....	431.06	.....	8,809.44	6.42	19.00
25.70	.....	146.15	126.71	107.73	3,587.47	.....	.....	145.62	3,733.09	9.68	23.00
.....	.....	22.00	147.97	25.00	3,380.51	.....	.....	196.36	3,576.87	6.43	12.39
170.71	.....	422.00	715.60	1,124.93	10,350.23	.....	36.00	.....	10,386.23	7.22	24.53
.....	.....	50.60	94.96	130.56	2,907.86	.....	.....	69.29	2,977.15	5.06	18.52
55.44	.....	196.75	205.30	141.08	6,851.80	.....	.....	.....	6,851.80	6.06	21.91
.....	.....	48.00	135.00	23.75	2,239.99	.....	.....	69.68	2,309.67	2.85	17.36
86.28	.....	12.30	9.65	.....	505.12	.....	.....	.....	505.12	3.33	18.71
.....	.....	.....	26.00	.....	890.23	.....	.....	.....	890.23	2.91	17.80
58.46	58.50	59.08	104.48	.....	1,585.60	.....	.....	.....	1,585.60	3.72	14.81
.....	.....	.....	53.10	.....	1,532.92	.....	.....	.....	1,532.92	4.00	11.44
.....	.....	43.40	5.00	.....	1,338.96	.....	.....	.....	1,338.96	5.18	18.34
140.00	.....	166.00	300.00	107.31	6,442.44	.....	137.62	1,060.00	7,640.06	9.96	19.89
.....	.....	.....	8.00	6.77	305.74	.....	.....	153.45	459.19	2.61	20.38
.....	.....	44.00	64.93	104.81	1,937.32	.....	.....	69.63	2,006.95	3.65	31.25
.....	.....	400.00	500.00	100.00	6,493.14	.....	700.00	.....	7,193.14	10.16	20.61
\$720.47	\$146.25	\$4,219.23	\$6,768.18	\$3,959.77	\$102,016.21	\$3,208.60	\$1,576.87	\$6,052.03	\$112,853.71	\$5.30	\$21.55

‡ On one thousand dollars of inventoried valuation.

## TABLE No. I.—GRAFTON COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Alexandria.....	8		6	1	27	23	25.20
Ashland, town district.....	2		12		25	24	24.50
Ashland, special district.....	6	6			36	36	36.00
Bath, town district.....	6	6	3	1	30	30	30.00
Bath, special district.....	2	2			36	36	36.00
Benton.....	3		12		30	25	27.00
Bethlehem, town district.....	5		12		29	28	29.20
Bethlehem, special district.....	3	3			35	35	35.00
Bridgewater.....	3		3		28	20	23.53
Bristol, town district.....	3		12	1	27	24	25.00
Bristol, special district.....	5	5			36	36	36.00
Campton.....	9	2	4	1	34	*18	29.75
Canaan, town district.....	9		3	1	30	30	30.00
Canaan, special district.....	2	2			36	36	36.00
Dorchester.....	6		12	3	23	*19	21.83
Easton.....	3		3		34	*8	25.00
Ellsworth.....	1		1		20	20	20.00
Enfield.....	14	14	4		35	20	30.64
Franconia.....	3	3			36	36	36.00
Grafton.....	10		3	2	26	23	24.40
Groton.....	4		3		27	24	26.05
Hanover, town district.....	6	6	2		34	30	32.00
Hanover, special district.....	4	4			36	36	36.00
Haverhill, town district.....	14	14			30	30	30.00
Haverhill, Woodsville district...	6	6			36	36	36.00
Hebron.....	2				31	30	30.50
Holderness.....	6	6	1		28	24	27.33
Landaff.....	6		2	1	23	*19	21.33
Lebanon, town district.....	12	12	4		36	34	34.35
Lebanon, special district.....	14	14			36	36	36.00
Lebanon, West Lebanon district...	3	3			36	36	36.00
Lincoln.....	4	3			26	35	35.75
Lisbon, town district.....	7		1	4	32	20	29.97
Lisbon, special district.....	5	5			36	36	36.00
Lisbon, Sugar Hill district.....	1				30	30	30.00
Littleton.....	21	21		1	36	35	35.95
Lyman.....	5		2		32	*10	30.50
Lyme.....	11		1	5	32	32	32.00
Monroe.....	4		1		30	30	30.00
Orange.....	3		2		20	20	20.00
Orford.....	7	7		1	33	32	32.85
Piermont.....	6	6	2		36	31	33.75
Plymouth.....	11	11	2	1	36	26	35.17
Rumney.....	6	2	1		30	29	29.16
Thornton.....	7		3	1	21	*11	21.00
Warren.....	6	6	2		30	20	28.50
Waterville (no schools).....							
Wentworth.....	8	1	2	2	28	21	22.55
Woodstock.....	4	4	1		35	32	34.05
Total.....	294	174	72	26			30.59

\* Scholars conveyed.

## TABLE No. II.—GRAFTON COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Alexandria	9			9	\$4,000 00	\$800.00
Ashland, town district	3			3	2,500.00	100 00
Ashland, special district	1			6	20,000.00	500 00
Bath, town district	7			8	4,700.00	400 00
Bath, special district	1			2	3,500.00	200 00
Benton	3			3	1,600.00	100 00
Bethlehem, town district	9			10	6,000.00	300 00
Bethlehem, special district	1			6	4,000.00	200 00
Bridgewater	6			6	2,000.00	250 00
Bristol, town district	6			6	1,500.00	450 00
Bristol, special district	1			6	15,000.00	300 00
Campton	12			12	5,000.00	150 00
Canaan, town district	12	3		12	5,000.00	300 00
Canaan, special district	1			4	5,000.00	100 00
Dorchester	6			6	2,000.00	100 00
Easton	3			3	500.00	10 00
Ellsworth	1			1	500.00	10 00
Enfield	10		1	16	20,000.00	125.00
Franconia	3	2		5	18,400.00	1,000.00
Grafton	10			10	5,700.00	100 00
Groton	4			4	1,000.00	50 00
Hanover, town district	10			10	3,000.00	100 00
Hanover, special district	1			8	27,000.00	800 00
Haverhill, town district	11		1	18	25,000.00	600 00
Haverhill, Woodsville dist.	1			7	30,000.00	350 00
Hebron	2			2	700.00	25 00
Holderness	7			7	3,000.00	200 00
Landaff	6			6	2,000.00	50 00
Lebanon, town district	9			13	14,000.00	175 00
Lebanon, special district	3			21	50,000.00	1,300.00
Lebanon, West Lebanon dist.	1			4	12,000.00	500 00
Lincoln	2			4	5,000.00	50 00
Lisbon, town district	8			8	6,000.00	400 00
Lisbon, special district	1			6	31,000.00	500 00
Lisbon, Sugar Hill district	1			2	1,000.00	40 00
Littleton	14			25	63,465.00	800 00
Lyman	6			6	4,000.00	75 00
Lyme	12			12	5,500.00	150 00
Monroe	6			7	3,250.00	150 00
Orange	5	1		5	825.00	
Orford	4			7	6,000.00	100 00
Piermont	8			9	4,800.00	200 00
Plymouth	8			30	140,000.00	6,400 00
Rumney	5			6	4,800.00	250 00
Thornton	7			7	5,350.00	265 00
Warren	4			7	5,000.00	
Waterville (no schools)						
Wentworth	9			10	3,000.00	50 00
Woodstock	4			4	3,500.00	100 00
Total	264	6	2	389	\$587,000.00	\$19,175.00

TABLE No. III.—GRAFTON COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Alexandria.....	43	39	47	56	...	91	12	...	...	4	79	65	84	...	...	...
Ashland, town.....	10	16	12	16	...	28	...	...	...	...	23	21	91	...	...	...
Ashland, special.....	124	115	148	127	3	267	5	9	7	...	248	224	88	...	...	...
Bath, town.....	52	40	54	43	2	93	2	11	...	...	82	77	93	...	...	...
Bath, special.....	22	24	21	21	...	38	4	2	...	...	40	37	92	...	...	...
Benton.....	24	10	38	13	...	50	1	...	...	...	50	38	76	...	...	...
Bethlehem, town.....	81	69	44	46	...	89	1	18	...	...	69	55	78	...	...	...
Bethlehem, special.....	28	30	57	52	...	89	20	12	...	...	73	68	92	...	...	...
Bridgewater.....	11	16	26	21	...	46	1	2	...	...	28	25	89	...	...	...
Bristol, town.....	21	15	24	19	...	40	3	5	...	...	37	34	93	...	...	...
Bristol, special.....	68	76	90	101	...	177	14	...	10	...	152	137	91	...	30	...
Campton.....	66	48	84	73	1	152	4	...	11	3	128	117	91	...	3	...
Canaan, town.....	82	89	95	83	1	177	...	2	...	...	178	155	84	...	...	...
Canaan, special.....	46	44	52	42	...	85	9	4	1	...	85	76	89	...	...	...
Dorchester.....	32	20	48	27	...	75	...	1	...	...	57	50	89	...	...	...
Easton.....	23	13	26	20	1	45	...	...	2	...	46	31	67	...	...	...
Ellsworth.....	6	9	15	13	...	28	...	...	...	...	23	14	65	...	...	...
Enfield.....	172	210	153	183	...	329	7	2	1	...	267	245	91	...	...	...
Franconia.....	46	44	52	48	...	98	2	5	...	...	90	80	89	...	...	...
Grafton.....	66	52	84	87	6	158	7	...	5	141	126	88	...	...	...	...
Groton.....	34	24	32	21	1	49	3	...	...	1	39	35	89	...	1	...
Hanover, town.....	94	84	65	66	...	130	1	...	...	...	99	88	87	...	...	...
Hanover, special.....	70	76	130	151	4	235	42	5	...	...	243	226	93	...	...	...
Haverhill, town.....	188	187	213	213	...	402	24	11	...	...	331	293	88	...	...	2
Haverhill, special.....	164	140	186	166	...	305	47	10	...	...	311	284	91	1	3	...
Hebron.....	6	9	20	17	...	34	3	...	1	1	37	33	89	...	...	...
Holderness.....	46	51	60	57	3	111	3	...	...	...	70	61	89	...	...	...
Landaff.....	48	41	57	48	3	102	...	...	...	...	83	73	87	...	...	2
Lebanon, town.....	159	176	161	158	2	317	...	26	2	...	255	231	90	...	...	...
Lebanon, special.....	248	262	302	307	...	533	76	29	...	...	525	494	93	...	...	...
Lebanon, special.....	67	70	73	77	...	139	11	...	...	...	137	124	90	...	2	...
Lincoln.....	77	68	88	76	...	164	...	10	...	...	139	122	87	2	...	1
Lisbon, town.....	56	54	58	52	2	106	2	...	6	5	69	62	89	...	...	...
Lisbon, special.....	116	117	135	139	1	252	21	8	...	...	229	208	90	...	2	...
Lisbon, special.....	12	7	15	11	...	26	...	1	...	...	17	15	88	...	...	...
Littleton.....	379	405	431	445	...	802	74	15	...	...	756	693	91	...	8	...
Lyman.....	38	40	38	40	...	77	1	...	6	...	67	57	85	...	...	1
Lyme.....	90	96	100	100	...	198	2	...	1	5	132	122	92	...	...	...
Monroe.....	49	51	57	54	...	110	1	...	7	...	82	73	88	...	...	...
Orange.....	25	26	31	20	...	49	2	...	...	...	48	38	79	...	1	...
Orford.....	78	76	77	80	1	154	2	...	3	...	123	105	85	...	...	2
Piermont.....	64	65	53	65	...	114	4	...	...	6	90	80	89	...	...	...
Plymouth.....	177	179	252	260	3	438	71	75	...	...	454	387	85	...	...	3
Rumney.....	75	69	77	71	1	142	5	...	15	1	114	105	92	...	...	...
Thornton.....	59	43	49	47	3	89	4	...	1	...	79	71	89	...	...	...
Warren.....	74	75	82	77	...	157	2	...	4	...	143	122	85	...	...	...
Waterville.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wentworth.....	45	45	64	59	1	119	3	...	2	2	100	88	87	...	...	...
Woodstock.....	93	92	93	68	...	160	1	...	11	...	130	120	91	...	...	...
Total.....	3,654	3,607	4,169	4,036	39	7,669	497	174	158	55	6,798	6,085	89	3	48	15

\* Between five and sixteen inclusive.

† Woodsville district.

‡ West Lebanon district.

§ Sugar Hill district.

|| No schools.



TABLE No. IV.—GRAFTON COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Alexandria.....	2	\$28.00	10	\$27.00	3		2		2
Ashland, town district..			3	30.00	2	1			
Ashland, special dist...			9	45.33			7	1	
Bath, town district.....			6	29.33	4				
Bath, special district...			12	42.50					
Benton.....	1	20.00	5	20.00	1	5			
Bethlehem, town dist..	1	32.00	6	30.93					
Bethlehem, special dist.			3	36.00			3	1	
Bridgewater.....			5	28.00	1	4			
Bristol, town district..			5	26.66	1				
Bristol, special district.			5	40.00			2	2	
Campton.....	1	30.00	15	31.55	4		3		
Canaan, town district..			9	30.00	2	2			
Canaan, special district.			2	36.66					
Dorchester.....	2	24.00	4	46.00	3	4	1		1
Easton.....	1	33.00	3	29.66	1	1	1	1	
Ellsworth.....			2	18.00					
Enfield.....	2	61.72	12	32.43	2	7			
Franconia.....			3	45.33		1	2		
Grafton.....			8	28.25	4	4			
Groton.....			6	24.12	1	5			
Hanover, town district..			11	29.08	2	1	1		
Hanover, special dist..			4	48.50			2	2	
Haverhill, town district	1	32.00	13	32.28	3		2	1	
Haverhill*.....			6	41.66	2		5		
Hebron.....			2	28.00		2			
Holderness.....	1	32.00	10	33.50	2				
Landaff.....	1	32.00	9	26.94	1	7			
Lebanon, town district..	2	40.00	10	27.60	2	1	3		
Lebanon, special dist..	2	64.83	12	37.17	1	1	3	1	2
Lebanon†.....			3	39.44					
Lincoln.....			4	37.00			2	1	1
Lisbon, town district..			14	26.06	3	4			1
Lisbon, special district.			6	40.84			3		
Lisbon, Sugar Hill dist.	1	40.00	1	32.00	1			1	
Littleton.....			22	38.53	6	2	15		
Lyman.....			6	29.86	1				
Lyme.....	1	30.00	4	30.09	2	2	1		
Monroe.....			5	28.25		1			
Orange.....	1	20.00	3	26.25		3			1
Orford.....	1	36.00	10	32.00	2	2		1	
Piermont.....			11	29.25		4	1		
Plymouth.....			18	53.10	1		10	1	
Rumney.....			11	30.98	1		2		
Thornton.....			7	29.50	1			1	
Warren.....			8	35.33	2	2	1	1	
Waterville (no schools).									
Wentworth.....	1	40.00	15	29.80	1	2			
Woodstock.....			6	36.83			2	1	
Total.....	22	\$37.00	354	\$33.18	64	68	74	18	8

\* Woodsville district.

† West Lebanon district.

TABLE No. V.—  
(For the year ending  
REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Alexandria .....	\$87.86	\$742.50	\$100.00	\$73.36	\$53.33	\$95.00	\$67.10	.....	.....
Ashland, town .....	144.28	172.50	192.50	79.37	.....	43.04	14.03	.....	.....
Ashland, special .....	964.81	1,507.50	1,700.00	427.89	421.36	50.00	184.83	.....	\$186.66
Bath, town .....	659.48	847.67	600.00	120.00	327.00	48.70	76.25	\$70.17	135.00
Bath, special .....	632.15	554.83	465.03	80.00	90.00	.....	29.89	.....	90.00
Benton .....	353.85	367.50	232.50	18.22	.....	25.00	25.62	41.06	.....
Bethlehem, town .....	697.03	1,258.12	1,525.00	97.46	639.00	82.00	79.85	.....	.....
Bethlehem, spec. .....	40.69	1,029.38	1,912.99	195.48	.....	50.00	60.97	.....	.....
Bridgewater .....	69.20	390.00	.....	.....	80.00	28.00	19.52	.....	.....
Bristol, town .....	409.07	527.68	200.00	15.00	159.98	45.00	30.50	.....	.....
Bristol, special .....	1,864.44	2,539.82	1,000.00	202.89	.....	107.55	114.07	.....	.....
Campton .....	418.26	1,380.00	745.00	150.00	445.32	113.12	93.33	112.53	.....
Canaan, town .....	.....	1,162.06	993.52	82.99	80.00	76.00	105.63	.....	.....
Canaan, special .....	38.05	667.94	500.00	100.00	40.00	59.00	63.95	.....	.....
Dorchester .....	500.00	270.00	150.00	125.83	11.50	56.75	48.19	135.66	.....
Easton .....	34.72	382.50	200.00	33.62	45.00	23.00	31.11	38.01	.....
Ellsworth .....	25.27	60.00	15.00	5.50	.....	8.00	10.37	48.09	.....
Enfield .....	815.76	2,460.00	1,500.00	539.55	101.63	105.00	211.06	.....	120.00
Franconia .....	549.85	1,335.00	400.00	375.97	.....	22.50	53.68	.....	180.00
Grafton .....	57.59	1,140.00	.....	50.00	100.00	92.65	90.38	164.00	.....
Groton .....	.....	315.00	200.00	44.71	18.00	24.25	34.16	81.31	.....
Hanover, town .....	426.57	1,233.00	1,028.44	113.10	243.05	113.50	82.96	143.96	100.00
Hanover, special .....	1,209.40	2,877.00	1,445.84	720.27	.....	120.00	143.96	.....	.....
Haverhill, town .....	721.86	2,563.80	2,190.65	434.95	.....	.....	170.82	729.34	225.00
Haverhill* .....	747.48	1,846.20	4,512.17	315.05	.....	48.00	273.87	527.93	225.00
Hebron .....	2.73	330.00	50.00	52.15	73.34	15.25	23.79	40.59	.....
Holderness .....	410.74	1,042.50	600.00	189.14	.....	60.00	64.05	.....	186.66
Landaff .....	153.20	810.00	.....	66.00	.....	37.00	58.56	.....	.....
Lebanon, town .....	.....	2,018.18	3,200.00	185.43	616.45	155.00	205.57	.....	280.00
Lebanon, special .....	177.32	4,904.65	7,500.00	1,222.93	.....	200.00	345.87	.....	390.00
Lebanon† .....	6.25	998.17	2,200.00	248.51	.....	83.00	89.06	.....	.....
Lincoln .....	.....	1,432.50	600.00	112.69	343.00	43.50	81.74	.....	.....
Lisbon, town .....	.....	1,137.32	776.28	59.84	339.00	68.00	76.25	.....	.....
Lisbon, special .....	.....	2,071.32	4,625.64	341.14	.....	35.00	167.75	.....	.....
Lisbon† .....	.....	706.36	.....	13.39	.....	.....	13.42	.....	.....
Littleton .....	1,505.65	6,097.50	10,902.50	.....	.....	132.75	520.94	.....	720.00
Lyman .....	188.32	495.00	200.00	35.67	.....	46.00	49.41	116.73	.....
Lyme .....	106.79	1,560.00	1,100.00	325.91	.....	114.00	136.03	152.55	.....
Monroe .....	54.96	742.50	300.00	90.43	214.02	70.50	112.66	.....	.....
Orange .....	106.16	180.00	170.00	10.40	.....	27.75	31.11	124.74	.....
Orford .....	1,099.36	1,117.50	400.00	240.80	132.33	80.90	96.38	196.18	175.00
Piermont .....	238.34	960.00	650.00	189.15	132.00	55.00	78.08	115.96	125.00
Plymouth .....	950.58	3,825.00	9,000.00	1,222.79	.....	185.00	259.86	.....	.....
Rumney .....	91.50	1,357.50	100.00	100.00	599.33	83.20	101.26	.....	.....
Thornton .....	58.02	562.50	500.00	207.74	20.00	53.50	62.83	71.15	.....
Warren .....	523.56	1,110.00	331.00	272.57	77.00	89.50	96.99	140.82	220.00
Waterville§ .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wentworth .....	62.46	825.00	500.00	101.00	160.01	80.00	87.23	115.77	.....
Woodstock .....	352.89	735.00	550.00	125.47	469.37	47.00	92.11	.....	.....
Total .....	\$17,554.41	\$62,735.50	\$66,064.06	\$9,844.36	\$6,031.07	\$3,197.91	\$4,966.95	\$3,166.55	\$3,358.32

\* Woodsville district.

† West Lebanon district.

‡ Sugar Hill district.

§ No schools.



## GRAFTON COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (current).	Total of current revenue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
...	\$18.00	\$128.40	\$148.59	\$1,514.14	...	...	...	\$200.00	...	\$1,714.14
...	...	23.70	...	669.42	...	...	...	200.00	...	869.42
121.52	...	213.30	...	5,867.87	...	...	...	100.00	...	5,967.87
164.88	30.00	59.15	...	3,138.30	...	...	...	50.00	...	3,188.30
53.44	...	...	...	1,995.34	...	...	...	100.00	...	2,095.34
...	...	34.70	...	1,098.45	...	...	...	75.00	...	1,173.45
261.55	...	43.25	...	4,683.26	...	...	...	...	...	4,683.26
...	...	35.39	580.95	3,905.85	...	...	...	...	...	3,905.85
...	...	68.94	...	655.66	...	...	...	...	...	655.66
28.16	...	37.68	...	1,453.07	...	...	...	75.00	...	1,528.07
148.24	...	150.72	34.40	6,162.13	...	...	...	...	...	6,162.13
130.48	...	130.30	10.60	3,728.94	...	...	...	125.00	...	3,853.94
6.40	...	122.85	21.70	2,651.15	...	...	...	200.00	...	2,851.15
5.60	...	71.00	108.13	1,651.67	...	...	...	...	...	1,651.67
...	...	75.00	...	1,372.93	...	...	...	...	...	1,372.93
...	24.00	...	...	811.96	...	...	...	...	...	811.96
...	...	13.15	...	185.38	...	...	...	...	...	185.38
64.48	...	225.33	473.03	6,645.89	\$5,000.00	...	\$9,000.00	300.00	\$223.75	21,169.64
...	...	103.00	130.00	3,150.00	...	...	...	...	...	3,150.00
32.48	15.50	144.00	2.75	1,889.16	...	...	...	200.00	...	2,089.16
...	...	...	40.00	757.43	...	...	...	100.00	...	857.43
31.84	25.87	106.29	...	3,648.58	...	...	...	200.00	...	3,848.58
...	64.62	256.56	836.99	7,674.64	...	...	1,875.00	500.00	...	10,049.64
...	849.01	256.25	226.25	8,367.93	2,000.00	...	8,000.00	...	...	18,367.93
...	82.63	213.90	416.00	9,208.23	...	...	...	...	...	9,208.23
...	...	24.00	...	611.85	...	...	...	10.00	...	621.85
71.64	...	196.07	...	2,820.80	...	...	...	200.00	...	3,020.80
...	39.85	67.51	...	1,232.12	...	...	...	...	...	1,232.12
404.28	...	122.13	661.00	7,818.04	...	...	...	...	1,500.00	9,318.04
...	...	287.73	1,205.45	16,231.00	...	...	...	...	...	16,231.00
...	...	58.61	...	3,683.60	...	...	...	200.00	...	3,883.60
...	...	35.00	...	2,648.43	...	...	...	...	...	2,648.43
300.44	...	...	...	2,757.13	...	...	...	...	...	2,757.13
...	...	...	607.47	7,848.32	...	...	...	...	706.00	8,554.32
79.64	...	...	...	812.81	...	...	...	...	...	812.81
...	...	478.31	949.82	21,307.47	...	...	...	...	...	21,307.47
5.49	...	...	...	1,136.62	...	...	...	...	...	1,136.62
3.36	161.03	142.23	...	3,801.90	...	...	...	100.00	...	3,901.90
...	...	...	65.90	1,650.97	...	...	...	150.00	...	1,800.97
...	...	...	5.00	655.16	...	...	...	...	...	655.16
...	101.66	152.45	303.61	4,096.17	...	...	...	200.00	...	4,296.17
18.40	171.75	106.20	5.00	2,844.88	...	...	...	...	...	2,844.88
...	...	274.60	2,818.88	18,536.71	...	...	...	...	...	18,536.71
127.44	...	129.60	10.00	2,699.83	...	...	...	250.00	...	2,949.83
24.12	78.75	72.00	...	1,710.61	...	...	...	175.00	...	1,885.61
24.12	139.63	127.05	55.00	3,207.24	500.00	...	...	...	...	3,707.24
...	...	...	...	...	...	...	...	...	...	...
68.96	99.73	118.50	...	2,218.66	...	...	...	250.00	100.00	2,568.66
...	35.00	95.45	...	2,502.29	...	...	...	62.00	...	2,564.29
\$2,176.96	\$1,937.03	\$5,000.35	\$9,716.52	\$195,749.99	\$7,500.00	...	\$18,875.00	\$4,022.00	\$2,529.57	\$228,676.74

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Alexandria.....	\$73.36			\$1,302.00		\$53.33	\$95.50		\$2.50
Ashland, town.....	66.77	\$12.60	\$3.31	367.50			43.04		
Ashland, special.....	209.85		218.04	2,422.18	\$249.16	421.36		\$50.00	
Bath, town.....	21.49		16.32	1,245.00	135.00	327.00	48.70		21.50
Bath, special.....	53.62		24.81	782.75	180.00	90.00	16.50		
Benton.....	18.22			565.00			20.00	5.00	
Bethlehem, town.....	14.40	27.34	55.72	1,450.60		639.00	82.00		319.00
Bethlehem, spec.....	85.50	54.86	55.12	2,610.00			50.00		
Bridgewater.....	1.40		3.00	483.00		80.00	28.00		13.00
Bristol, town.....			15.00	508.00		159.98	45.00		70.00
Bristol, special.....	107.21		95.68	2,340.00		226.74	107.55		
Campton.....	31.03		72.66	1,762.80		445.32	111.62	1.50	
Canaan, town.....	46.94		36.05	2,129.00		80.00	60.00	16.00	78.70
Canaan, special.....	50.00		50.00	1,246.00		40.00	50.00	9.00	
Dorchester.....	92.44		33.39	752.00		11.50	51.75	5.00	24.75
Easton.....	17.77		15.85	559.00		45.00	23.00		
Ellsworth.....	5.50			85.00			8.00		
Enfield.....	407.35		162.20	4,260.00	220.00	101.68	105.00		5.00
Franconia.....	97.69	76.21	202.07	1,189.00	360.00		22.50		420.00
Grafton.....	55.27		11.48	1,549.40		157.33	75.00	17.65	30.00
Groton.....	37.56		7.15	625.40		18.00	19.25	5.00	22.48
Hanover, town.....	80.00		33.10	1,408.75	230.00	243.05	101.50	12.00	409.00
Hanover, special.....	359.94	143.90	216.43	4,305.55			120.00		
Haverhill, town.....	228.32	128.15	721.85	4,490.05	225.00				207.00
Haverhill*.....	239.34	36.93	187.94	4,426.00	325.00		38.00	10.00	
Hebron.....	22.48		5.00	427.00		28.00	11.00	4.25	
Holderness.....	129.97		59.17				50.00	10.00	162.25
Landaff.....	36.00		30.00	861.55			33.00	4.00	
Lebanon, town.....	88.85	10.58	86.00	3,132.50	536.68	616.45	155.00		95.91
Lebanon, special.....	491.62	351.62	379.69	8,551.51	731.50		175.00	25.00	
Lebanon †.....	107.33	50.00	91.18	1,943.92			75.00	8.00	
Lincoln.....	61.51		51.18	1,332.00		343.00	18.50	25.00	
Lisbon, town.....	3.34	46.50	10.00	1,347.00		339.00	68.00		235.00
Lisbon, special.....	175.00	75.00	91.14	4,471.71			25.00	10.00	
Lisbon ‡.....	8.74		4.65	250.00		96.00	14.00		
Littleton.....	446.05	69.75	513.42	11,361.17	1,440.00		75.00	57.95	956.00
Lyman.....			35.67	993.50			46.00	7.00	
Lyme.....	277.08		48.85	2,718.15			105.00	9.00	10.00
Monroe.....	77.45		23.23	875.00		214.02	64.50	6.00	275.00
Orange.....	1.70		8.40	312.50			24.75	3.00	10.00
Orford.....	130.00	45.00	65.80	1,890.00	350.00	132.33	61.90	19.00	467.15
Piermont.....	84.48	41.00	63.67	1,317.25	250.00	132.00	55.00		630.50
Plymouth.....	393.44	406.65	422.70	7,173.00			170.00	15.00	13.00
Rumney.....	94.32		42.66	1,338.87		599.33	76.70	6.50	245.00
Thornton.....	100.75	20.15	86.84	1,005.55		20.00	48.50	5.00	96.20
Warren.....	197.17		75.40	1,568.00	428.33	77.00	60.00	29.50	311.50
Waterville §.....									
Wentworth.....	52.89		30.70	1,337.10		160.01	75.00	5.00	125.00
Woodstock.....	82.55		42.92	1,291.40		469.37	47.00		25.50
Total.....	\$5,453.69	\$1,596.24	\$4,505.44	\$98,362.66	\$5,660.67	\$6,365.80	\$2,855.76	\$380.35	\$5,280.94

\* Woodsville district. † West Lebanon district. ‡ Sugar Hill district. § No schools.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	% Rate of school assessment.	Average of current expenditure per pupil.
\$14.82			\$75.51	\$15.85	\$1,632.87			\$153.41	\$1,786.28	\$3.16	\$20.67
22.99		\$300.00	292.14	141.85	493.22			125.00	618.22	6.31	21.44
		48.70	106.22	21.67	1,991.60	\$357.91		122.79	4,808.27	5.19	16.39
		36.00	96.25	21.80	1,301.73			96.24	2,087.84	6.73	21.42
59.47	\$75.00	50.45	79.59	64.90	752.71			2.92	1,614.65	7.51	30.99
30.87	46.00	175.00	156.59	41.03	2,857.24			75.00	827.71	2.99	15.05
			19.00		3,304.97	200.00	54.75		2,857.24	5.34	32.84
			16.50		627.40				3,559.72	8.28	45.27
			789.90	87.16	814.48			36.53	627.40	2.90	20.91
		281.80	91.87	89.21	4,036.04			1,487.18	851.01	3.46	19.39
		21.98	91.87	89.21	2,627.99			28.61	5,551.83	4.92	24.91
18.00		36.00	100.00	90.00	2,690.69			91.87	2,719.86	4.60	18.50
		72.00	50.00		1,567.00			200.00	2,890.69	5.41	15.11
16.50		12.00	17.90	19.00	1,036.23				1,567.00	5.51	18.43
16.00		28.50	30.00	17.20	752.32				1,036.23	3.95	17.87
					98.50				752.32	3.33	15.67
56.	180.00	223.25	297.55	115.22	6,133.54	13,555.06		266.05	98.50	2.67	4.28
		109.75	150.03	123.05	2,750.30				19,954.65	6.36	22.88
		2.00	71.05	11.25	1,980.43			42.13	2,750.30	4.01	30.56
			9.00	39.75	783.59				2,022.56	3.68	13.66
199.51		26.15	75.12		2,818.18				783.59	4.07	19.59
100.35	169.20	452.70	875.24	392.87	7,136.18			199.51	3,017.69	4.41	28.46
137.03	50.00	282.00	393.17	98.91	6,961.48	9,288.52		2,375.00	9,511.18	3.63	29.37
3.75		343.50	523.28	100.90	6,224.64				16,250.00	8.49	21.03
13.59		10.00	16.00		537.23			25.00	6,224.64	6.94	20.00
20.00			78.20		509.59				562.23	3.85	14.52
21.28		21.25	67.50	40.00	1,114.58				509.59	3.54	7.28
66.40	45.30	204.95	323.99	897.50	6,260.11	1,745.21	237.50	149.40	1,114.58	3.52	13.43
323.03	25.00	941.00	835.30	460.86	13,291.13		813.66	576.34	8,392.22	5.08	22.12
15.00		252.00	364.89	250.68	3,158.00		49.10	253.20	14,681.13	7.40	25.13
48.63		131.50	287.76	12.71	2,311.79			102.78	3,460.30	8.87	23.05
7.90		56.00	73.50	12.40	2,198.64				2,414.57	6.50	15.51
85.48		344.00	610.00	311.92	6,199.25		706.00		2,198.64	4.73	27.08
12.50		15.00	23.50	2.15	426.54				6,905.25	8.67	27.47
528.00		1,165.60	1,701.03	871.68	19,185.65		816.83	1,172.44	426.54	3.46	23.60
					1,082.17				21,174.92	9.45	25.36
	27.00	65.55	89.55	30.68	3,380.86			189.17	1,082.17	3.67	14.82
9.17		26.00	57.87	37.98	1,666.22			58.40	3,570.03	5.13	24.49
			9.00	10.35	379.70				1,724.62	3.04	18.73
100.66	96.00	192.00	146.80	12.89	3,769.53			107.35	379.70	3.56	7.91
18.87		43.75	23.10	12.00	2,671.62				3,816.88	6.89	29.44
375.62		562.00	1,083.89	5,069.00	15,714.30				2,671.62	4.54	27.83
		21.75	41.25	87.49	2,553.87			300.27	15,714.30	10.94	34.61
4.45		70.50	54.45		1,512.39			94.26	2,854.14	7.31	19.64
132.65		139.60	81.96	50.58	3,151.69	489.69	5.00		1,606.65	8.51	19.14
					2,105.39				3,646.38	5.22	21.44
185.67		28.30	49.35	56.37	2,105.39				2,105.39	5.25	20.24
58.00		85.77	66.50	23.90	2,192.91			62.00	2,254.91	3.20	15.55
\$2,702.39	\$713.50	\$6,878.30	\$10,481.25	\$9,777.07	\$161,014.06	\$25,636.39	\$3,021.45	\$8,364.24	\$198,036.14	\$4.88	\$22.22

\$ On one thousand dollars of inventoried valuation.

TABLE No. I.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Amherst .....	10	10	3	.....	35	32	33.20
Antrim .....	9	7	2	.....	32	30	31.43
Bedford .....	9	.....	4	.....	30	*11	27.77
Bennington .....	4	3	.....	.....	35	23	32.00
Brookline .....	4	4	1	.....	32	22	28.75
Deering .....	6	.....	4	.....	24	*11	21.13
Francestown .....	5	5	2	.....	30	*14	28.88
Goffstown, town district .....	11	2	3	3	32	29	29.45
Goffstown, special district .....	4	4	.....	.....	36	36	36.00
Greenfield .....	4	.....	1	.....	34	24	32.00
Greenville .....	4	4	.....	.....	36	36	36.00
Hancock .....	7	2	2	1	38	23	28.57
Hillsborough, town district .....	9	9	5	1	33	28	30.22
Hillsborough Bridge, special .....	6	6	.....	.....	36	33	35.00
Hollis .....	6	3	.....	.....	31	31	31.00
Hudson .....	7	7	1	.....	33	33	33.00
Litchfield .....	2	.....	1	.....	35	35	35.00
Lyndeborough .....	5	.....	2	.....	31	24	28.80
Manchester .....	128	123	1	.....	33	38	38.00
Mason .....	4	.....	1	.....	35	35	35.00
Merrimack .....	9	2	2	1	36	36	36.00
Milford .....	18	13	2	2	36	33	35.78
Mont Vernon .....	4	.....	2	1	28	26	27.30
Nashua .....	75	69	5	.....	36	36	36.00
New Boston .....	8	2	2	.....	30	30	30.00
New Ipswich .....	5	2	.....	.....	36	35	35.92
Pelham .....	5	.....	.....	.....	33	29	32.24
Peterborough .....	12	12	1	.....	36	*19	31.33
Sharon .....	1	.....	.....	.....	24	24	24.00
Temple .....	2	2	.....	.....	34	33	33.50
Weare .....	13	.....	2	.....	33	29	30.80
Wilton .....	11	11	.....	1	35	25	34.10
Windsor .....	1	.....	.....	1	10	10	†10.06
Total .....	408	302	49	11	.....	.....	34.39

\*Scholars conveyed.

† No scholars in town until spring term.

TABLE No. II.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture and sites.	Estimated value of apparatus.
Amherst.....	10			16	\$15,000.00	\$500.00
Antrim.....	7			12	15,000.00	150.00
Bedford.....	11		1	11	10,000.00	500.00
Bennington.....	3			4	3,500.00	125.00
Brookline.....	4			4	3,500.00	200.00
Deering.....	9	2		9	3,500.00	500.00
Francestown.....	6			7	4,000.00	200.00
Goffstown, town district...	10			11	6,000.00	160.00
Goffstown, special district	1			3	15,000.00	500.00
Greenfield.....	4			5	6,000.00	300.00
Greenville.....	3			6	12,000.00	400.00
Hancock.....	8			9	8,000.00	500.00
Hillsborough, town.....	16	1		16	10,000.00	700.00
Hillsboro' Bridge, special.	1			9	25,000.00	600.00
Hollis.....	8			11	13,000.00	500.00
Hudson.....	6			9	11,000.00	300.00
Litchfield.....	4	1		4	1,000.00	25.00
Lyndeborough.....	6			6	2,050.00	60.00
Manchester.....	26			149	801,031.00	37,069.00
Mason.....	6			6	3,000.00	368.00
Merrimack.....	10			12	12,850.00	275.00
Milford.....	10			25	71,000.00	700.00
Mont Vernon.....	4			4	3,000.00	200.00
Nashua.....	20			98	397,433.00	32,000.00
New Boston.....	10	1		15	10,000.00	500.00
New Ipswich.....	6			7	4,000.00	750.00
Pelham.....	5			5	5,932.00	1,200.00
Peterborough.....	7			15	7,000.00	1,500.00
Sharon.....	2			2	500.00	15.00
Temple.....	5	2		5	2,800.00	.....
Weare.....	15			17	10,500.00	250.00
Wilton.....	7			14	45,000.00	500.00
Windsor.....	1			1	350.00	50.00
Total.....	251	7	1	532	\$1,538,046.00	\$81,397.00



TABLE No. III.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Amherst.....	107	75	122	90	3	205	4	5			179	153	85			
Antrim.....	88	113	112	144		233	23	5			220	206	93		3	
Bedford.....	89	76	90	89	1	178		14			104	103	98			
Bennington.....	45	49	44	52		95	1	5			88	79	89			
Brookline.....	56	42	54	35		88	1	4			73	60	82	1		
Deering.....	24	14	36	27		63		3			44	44	93			
Francetown.....	56	57	60	53	1	111	1				96	82	85	2		
Goffstown.....	81	61	108	72	3	175	2	14			141	126	89	4		
Goffstown†.....	63	95	87	98		168	17	20			175	174	99	1		
Greenfield.....	51	63	60	47		107					101	61	59			
Greenville.....	178	166	65	60	3	121	1			12	103	95	93	266		
Hancock.....	56	32	68	45	1	109	3	7			90	79	88			
Hillsborough†.....	57	51	61	56		113	4	8			90	84	93			
Hillsboro' Bridge†.....	122	110	144	122		252	14	11			232	215	92	1	3	1
Hollis.....	88	60	96	60	4	127	25	1	1		141	130	92			
Hudson.....	111	113	117	110		227		22	2		177	156	88	3		
Litchfield.....	16	22	16	18	2	32		1	2		23	21	91			1
Lyndeborough.....	56	39	63	50		113					65	58	85			
Manchester.....	5,707	5,871	2,949	2,908	147	5,399	311	30			5,163	4,795	92	5,000		
Mason.....	35	43	47	38		85		4			70	61	87			
Merrimack.....	71	69	87	69	2	153	1	6	1		128	113	88	1		
Milford.....	391	327	437	381		694	124	31			716	667	93			11
Mont Vernon.....	32	37	40	40	2	78		4	6		42	38	89			
Nashua.....	2,332	2,227	1,509	1,601		2,914	196	44			2,662	2,446	91	1,600	7	
New Boston.....	88	74	86	89	2	159	14	1			143	127	86			
New Ipswich.....	82	81	61	80		141					111	98	88	20		
Pelham.....	73	72	84	76		160		11			119	104	87	3		
Peterborough.....	192	185	206	196		367	35	12			346	320	90			1
Sharon.....	2	3	3	4	1	6					6	5	83			
Temple.....	21	28	32	20		48	4		7		37	35	93			
Weare.....	97	111	134	138	5	260	7	5			211	177	83	3	4	
Wilton.....	154	160	170	180	1	325	24	7			302	276	92			
Windsor.....		1	2	1		3					3	3	100			
Total.....	10,621	10,527	7,250	7,049	178	13,309	812	154	121	31	12,201	11,191	92	6,905	17	14

\* Between five and sixteen inclusive.

† Town district.

‡ Special district.

TABLE No. IV.—HILLSBOROUGH COUNTY.

(For the year ending July 15, 1908.)

TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Amherst			14	\$33.40	2	1	3		
Antrim			9	33.11			3	3	
Bedford	1	\$28.00	13	31.00	5	5			
Bennington			5	36.00	2	1	2		1
Brookline			7	33.00	2	2			
Deering			8	28.50	2	4			
Francetown			5	28.40	1	1			
Goffstown, town dist.			15	30.60	1		3	1	
Goffstown, spec. dist.			4	40.00			4	1	1
Greenfield			4	33.50			1		
Greenville			4	42.00			1	1	
Hancock			12	36.00	3		1		1
Hillsborough, town			14	26.62	4	7			
Hillsboro' Bridge, spec.			7	39.14	1	1	1	1	1
Hollis	1	80.00	6	32.00	1		3	2	1
Hudson			7	32.28	1			2	
Litchfield			5	32.00	1	2	1		
Lyndeborough			6	32.00	1	1			
Manchester	12	129.16	133	57.31	3		26	89	4
Mason			5	36.00			1		
Merrimack			9	31.00	1		1		
Milford			19	41.61	1		5	3	
Mont Vernon			7	29.00	2		1	1	
Nashua	1	127.77	76	52.02	3		10	66	1
New Boston			9	32.44		1	1		
New Ipswich			8	34.25	3		1	1	1
Pelham			5	32.00	1	1		3	1
Peterborough			12	37.02	3		6		
Sharon			2	27.00		1			
Temple			5	34.20	2		4	4	
Weare	1	48.00	24	33.40	2	14	6	3	1
Wilton	1	94.44	14	37.81	1	1	4		1
Windsor			1	18.00		1			
Total	17	\$113.42	474	\$42.84	49	44	89	181	14



TABLE No. V.—

(For the year ending

REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Amherst .....	\$117.93	\$2,100.00	\$2,000.00		\$100.00	\$99.00	\$140.30		\$150.00
Antrim .....	934.96	2,445.00	2,061.00	\$250.00		190.00	147.62		250.00
Bedford .....	821.31	2,430.00		280.02	192.60	173.00	113.46		
Bennington .....		750.00	742.50	129.21	75.00	32.00	79.91		
Brookline .....		727.50	300.00	75.00	123.00	69.00	57.95		
Deering .....		690.00	100.00	16.16	76.00	63.41	39.04		
Francestown .....	220.94	1,125.00		127.45	350.00	90.00	67.10		
Goffstown, town. ....	1,429.32	2,531.30		118.34	220.30	83.00	111.62		
Goffstown, spec. ....	1,788.51	2,463.70	1,000.00	418.39		61.50	106.15		
Greenfield .....	202.11	892.50	400.00	100.00	88.92	60.00	67.71		
Greenville .....		2,085.00	839.12			60.00	76.25		
Hancock .....	342.98	1,185.00	800.00	150.00	300.00	118.50	72.59		
Hillsboro', town. ....	871.46	1,357.98	1,350.00	245.80	100.00	150.00	67.71		
Hillsboro' Br.* .....	3,620.55	3,082.02	1,250.00	584.97		80.00	151.28		250.00
Hollis .....	261.50	1,620.00	963.70	224.67	40.00	120.00	98.82		
Hudson .....	241.06	2,557.00	500.00	361.37	950.00	90.00	148.84		200.00
Litchfield .....	91.22	847.50	100.00	28.25	112.00	26.60	26.84		
Lyndeborough .....	33.29	787.50	411.03	180.19	143.00	109.37	80.50	\$93.06	
Manchester .....		119,325.00	24,629.65				3,620.35		
Mason .....	130.28	682.50	1.00	89.94		91.41	64.66		
Merrimack .....	44.25	2,527.50	300.00	587.55	1,078.50	165.00	113.46		
Milford .....		6,452.50	10,947.50			201.50	488.00		350.00
Mont Vernon .....	146.50	787.50	212.50		329.00	50.00	45.75		
Nashua .....		43,620.00	28,054.55	6,235.95			1,812.00		
New Boston .....	476.56	2,482.50	317.50	334.26		165.00	114.68		
New Ipswich .....	419.32	1,777.50	222.50	63.44	200.00	101.50	85.40		
Pelham .....	660.89	1,290.00	490.00	120.00	60.00	60.00	96.38		
Peterborough .....	893.83	5,310.00	940.00	750.00			227.53		250.00
Sharon .....		165.00	135.00	12.00		8.00	8.54		
Temple .....	13.23	517.50	82.50	28.24	184.00	35.00	28.06		
Weare .....	960.86	2,940.00		223.21	97.70	154.37	157.59		
Wilton .....	460.76	3,270.00	3,180.00			194.78	206.79		250.00
Windsor .....	34.79	75.00	25.00			7.00			
Total .....	\$15,218.41	\$220,899.50	\$82,355.05	\$11,734.41	\$4,820.02	\$2,908.94	\$8,722.88	\$93.06	\$1,700.00

\* Spectal district.

HILLSBOROUGH COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
.....	\$901.29	\$207.60	.....	\$5,816.12	.....	.....	.....	\$500.00	.....	\$6,316.12
.....	55.00	114.00	\$303.22	6,750.80	.....	.....	.....	350.00	\$451.00	7,551.80
.....	.....	274.45	91.00	4,375.84	.....	.....	.....	.....	.....	4,375.84
\$46.72	.....	128.40	.....	1,983.74	.....	.....	.....	25.00	125.00	2,133.74
.....	.....	91.30	.....	1,443.75	.....	.....	.....	75.00	.....	1,518.75
4.16	289.67	184.18	.....	1,462.62	.....	.....	.....	.....	.....	1,462.62
.....	.....	93.15	42.00	2,115.64	.....	.....	.....	.....	.....	2,115.64
.....	.....	175.31	23.00	4,692.19	.....	.....	.....	225.00	.....	4,917.19
.....	.....	170.61	286.05	6,294.91	.....	.....	.....	300.00	.....	6,594.91
.....	.....	74.80	48.00	1,934.04	.....	.....	.....	.....	.....	1,934.04
.....	.....	188.40	74.47	3,323.24	\$500.00	.....	.....	.....	.....	3,823.24
.....	.....	94.30	8.25	3,071.62	.....	.....	.....	150.00	.....	3,221.62
67.20	.....	122.36	.....	4,332.51	.....	.....	.....	.....	.....	4,332.51
.....	.....	277.40	415.50	9,711.72	.....	.....	.....	1,427.76	.....	11,139.48
.....	462.00	159.84	.....	3,950.53	.....	.....	.....	.....	.....	3,950.53
82.20	.....	362.94	29.58	5,522.99	.....	.....	.....	.....	.....	5,522.99
.....	.....	.....	38.65	1,271.06	.....	.....	.....	.....	125.00	1,396.06
8.96	46.18	141.00	.....	2,034.08	.....	.....	.....	.....	.....	2,034.08
.....	.....	.....	3,670.00	151,245.00	.....	.....	.....	.....	.....	151,245.00
.....	680.00	114.40	107.69	1,961.88	.....	.....	.....	.....	.....	1,961.88
.....	567.42	150.25	32.50	5,566.43	.....	.....	.....	250.00	60.00	5,876.43
.....	.....	382.70	1,116.18	19,938.38	.....	.....	.....	2,400.00	.....	22,338.38
.....	.....	77.02	19.00	1,667.27	.....	.....	.....	.....	.....	1,667.27
.....	.....	1,377.41	.....	81,099.91	.....	.....	.....	.....	.....	81,099.91
.....	.....	141.49	700.00	4,731.99	.....	.....	.....	100.00	.....	4,831.99
.....	304.40	141.10	81.09	3,396.25	.....	.....	.....	.....	.....	3,396.25
.....	.....	209.00	.....	2,986.27	.....	.....	.....	.....	100.00	3,086.27
.....	.....	360.72	222.30	8,954.38	.....	.....	.....	4,000.00	.....	12,954.38
.....	.....	14.00	.....	342.54	.....	.....	.....	.....	.....	342.54
.....	.....	64.60	.....	953.13	.....	.....	.....	50.00	.....	1,003.13
22.88	226.40	162.07	23.09	4,968.17	.....	.....	.....	400.00	.....	5,368.17
.....	458.00	260.00	282.95	8,563.28	.....	.....	.....	.....	.....	8,563.28
.....	.....	5.40	.....	147.19	.....	.....	.....	.....	.....	147.19
\$232.12	\$3,990.36	\$6,320.20	\$7,614.52	\$366,609.47	\$500.00	.....	.....	\$10,252.76	\$861.00	\$378,223.23

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Traut officers.	Transportation of pupils.
Amherst .....	\$341.07	\$20.00	\$110.02	\$3,089.82	\$300.00	\$100.00	\$99.00		\$322.00
Antrim .....	220.30	47.60	112.92	3,712.00	500.00		180.00	\$10.00	187.50
Bedford .....	199.80	35.50	33.42	1,872.80		192.60	173.00		238.40
Bennington .....	88.50		40.71	1,188.00		168.00	32.00		
Brookline .....	50.00		22.09	980.50		123.00	60.00	9.00	41.50
Deering .....	15.26		16.16	960.00		76.00	58.91	4.50	146.25
Frances town .....	69.68		57.77	1,004.00		251.66	90.00		287.75
Goffstown, town .....	88.34		30.05	2,111.50		220.30	78.00	5.00	
Goffstown, special .....	244.56		55.44	3,130.98			56.50	5.00	
Greenfield .....			84.23	1,079.00		301.00	60.00		110.00
Greenville .....	65.30	12.84	17.44	1,430.40		140.00	60.00	16.13	308.40
Hancock .....	151.95	46.00	48.00	1,836.30		255.00	111.00	7.50	11.10
Hillsborough, town .....	71.60	90.00	84.20	2,088.50		107.00	150.00		287.85
Hillsboro' Bridge* .....	360.94	105.85	118.18	3,997.69	500.00		75.00	5.00	
Hollis .....	162.00		224.67	1,545.00		40.00	120.00		449.35
Hudson .....	215.04		146.33	2,061.50	400.00	950.00	90.00		539.65
Litchfield .....	23.23	12.75	5.02	733.00		112.00	26.60		27.70
Lyndeborough .....	125.19	17.00	38.00	1,261.50		143.00	101.37	8.00	106.25
Manchester .....	4,201.90		2,978.83	103,580.36	2,300.00		220.00	1,000.00	
Mason .....	89.94			1,260.00			91.41		194.40
Merrinack .....	270.00	18.00	299.55	2,443.20		1,078.50	165.00		234.50
Milford .....	1,122.57		516.68	11,032.78	700.00		200.00	1.50	138.39
Mont Vernon .....	73.08			765.00			50.00		99.23
Nashua .....	2,025.10		4,210.85	49,805.45	2,000.00		100.00	950.00	400.00
New Boston .....	180.92	84.92	64.49	2,981.10			165.00		333.00
New Ipswich .....	37.86		25.58	1,548.90		346.00	100.00	1.50	646.50
Pelham .....	118.93			1,320.00		560.00	60.00		80.00
Peterborough .....		64.51	601.37	5,666.42	500.00				48.75
Sharon .....	10.00		4.00	150.00			8.00		
Temple .....		28.24		538.20		184.00	35.00		75.00
Weare .....	141.15	30.26	51.81	3,188.50		97.70	135.37	19.00	162.55
Wilton .....	636.78		125.83	5,186.72	500.00		184.78	10.00	172.00
Windsor .....				45.00			7.00		22.00
Total .....	\$11,400.99	\$613.47	\$10,123.64	\$223,594.12	\$7,700.00	\$5,445.76	\$3,142.94	\$2,052.13	\$5,670.02

\* Special district.

HILLSBOROUGH COUNTY.

July 15, 1908.)

ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	† Rate of school assessment.	Average of current expenditure per pupil.
		\$218.83	\$300.88	\$163.86	\$5,065.48			\$500.00	\$5,565.48	\$5.61	\$27.53
		160.75	443.80	684.37	6,259.24			210.12	6,469.36	7.78	28.45
\$356.85		36.50	119.50	137.32	3,395.69				3,395.69	3.37	28.77
41.35	\$900.00	62.50	77.38	37.40	1,745.44			43.40	1,788.84	6.87	18.76
		39.50	37.73	27.85	1,391.17			75.00	1,466.17	2.96	18.07
1.95		18.00	30.50		1,327.53				1,327.53	3.34	28.25
36.41		49.85	77.66	34.50	1,959.28			18.19	1,977.47	5.45	20.41
131.90	75.00	64.75	133.50	22.00	2,960.43				2,960.43	4.18	19.00
62.56	102.00	283.85	294.14	181.46	4,416.49		\$50.00	161.47	4,627.96	5.68	25.24
37.69	80.00	19.00	96.00		1,866.92				1,866.92	5.39	18.46
107.83	50.00	200.00	187.07	202.84	2,798.25	\$500.00	235.00		3,533.25	4.54	24.34
78.43		32.75	83.72	58.94	2,720.69				2,720.69	4.07	28.05
67.75	6.00	54.68	135.87	32.85	3,176.30				3,176.30	6.53	32.41
153.74		293.50	717.60	195.35	6,522.85			1,427.76	7,950.61	5.48	28.11
57.05	191.20	150.00	122.10	377.10	3,438.47				3,438.47	3.91	24.05
198.92		175.75	346.86	59.39	5,183.44				5,183.44	3.60	25.29
15.15	20.00	19.50	40.10	8.43	1,043.48				1,043.48	4.06	40.13
29.77		38.50	70.25	26.77	1,965.60				1,965.60	3.68	30.24
8,024.73		7,809.67	11,996.22	7,776.89	149,883.60			1,074.63	150,963.23	4.60	29.00
19.19		31.75	74.68	19.91	1,781.28			10.00	1,791.28	2.13	24.07
60.00		157.00	359.70	39.30	5,124.75			226.35	5,351.10	4.50	37.96
413.03		1,087.48	846.49	1,928.36	17,987.28			927.08	18,914.36	7.11	25.12
		20.10	57.55	32.50	1,097.46			162.52	1,259.98	3.28	21.10
2,095.12		7,465.54	8,535.34	61.17	77,648.57			3,452.26	81,100.83	4.87	28.42
75.15	25.00	105.15	155.17	76.15	4,246.05				4,246.05	4.31	29.69
4.00		56.75	78.96	29.00	2,875.05				2,875.05	3.81	25.90
101.83		41.25	84.43	87.26	2,453.70				2,453.70	3.81	18.87
292.03	10.00	327.95	606.68	538.10	8,655.81			4,000.00	12,655.81	3.52	25.02
					172.00				172.00	1.55	28.66
		22.50	17.75	20.98	921.67				921.67	3.75	20.95
75.47	12.82	93.91	161.52	123.82	4,293.88			376.58	4,670.46	4.22	19.88
56.32		554.50	373.69	225.51	8,026.13				8,026.13	6.44	25.97
2.00			4.00	3.50	83.50				83.50	2.98	27.83
\$12,596.31	\$581.62	\$19,691.76	\$26,666.84	\$13,212.88	\$342,492.48	\$500.00	\$285.00	\$12,665.36	\$355,942.84	\$4.47	\$27.72

† On one thousand dollars of inventoried valuation.

TABLE No. I.—MERRIMACK COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Allenstown .....	3	3			36	36	36.00
Andover .....	10	5	12		32	28	30.48
Boscawen, town district .....	4	4	12		36	30	31.50
Boscawen, special district .....	4	4			36	36	36.00
Bow .....	7		1	2	30	30	30.00
Bradford .....	8	2	12	2	28	27	27.65
Canterbury .....	7		3		35	30	30.40
Chichester .....	6		12		34	31	33.50
Concord, town district .....	9		3	1	36	*18	34.00
Concord, Union district .....	61	61			38	38	38.00
Concord, Penacook district .....	7	7			36	36	36.00
Danbury .....	6		3		22	22	22.00
Dunbarton .....	4		1		35	34	34.75
Epsom .....	6		2		31	27	29.66
Franklin .....	20	16	1	2	36	32	32.76
Henniker .....	9	3	1		38	20	31.55
Hill .....	5	2	2		33	32	32.80
Hooksett .....	9	2	2	2	33	33	33.00
Hopkinton .....	8	7	12		30	27	29.85
Loudon .....	10		8	2	31	*11	25.20
Newbury .....	6		4	2	28	22	26.50
New London .....	5	5		1	33	31	32.00
Northfield .....	5			1	31	25	27.20
Pembroke .....	9	9	2		35	*11	32.33
Pittsfield .....	10	10			36	33	33.90
Salisbury .....	6		1		27	27	27.00
Sutton .....	8	4	5	1	30	30	30.00
Warner .....	11	6		1	30	28	29.50
Webster .....	6		3	2	34	24	29.83
Wilmot .....	6		3	1	26	21	24.33
Total .....	275	150	56	20			32.19

\* Scholars conveyed.

TABLE No. II.—MERRIMACK COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Allenstown.....	2			5	\$9,000.00	\$100.00
Andover.....	10			112	8,000.00	150.00
Boscawen, town district..	6			7	4,500.00	75.00
Boscawen, special dist...	1			4	11,000.00	1,000.00
Bow.....	8			8	5,600.00	200.00
Bradford.....	9	2		10	3,000.00	225.00
Canterbury.....	9			9	4,500.00	70.00
Chichester.....	7			7	3,100.00	100.00
Concord, town district..	12			13	15,000.00	200.00
Concord, Union district..	17			96	530,000.00	50,000.00
Concord, Penacook dist..	3			11	19,000.00	550.00
Danbury.....	8			8	5,000.00	60.00
Dunbarton.....	7	2		7	2,500.00	100.00
Epsom.....	7			7	6,000.00	100.00
Franklin.....	10			28	78,700.00	1,300.00
Henniker.....	10	1		15	15,000.00	500.00
Hill.....	4			5	1,800.00	75.00
Hooksett.....	8			9	12,600.00	2,500.00
Hopkinton.....	14			17	13,000.00	500.00
London.....	11	1		12	5,000.00	500.00
Newbury.....	8	1		8	2,800.00	75.00
New London.....	6			8	8,500.00	200.00
Northfield.....	8			8	3,600.00	300.00
Pembroke.....	7	1	1	14	27,000.00	500.00
Pittsfield.....	8			12	20,000.00	500.00
Salisbury.....	7			7	3,700.00	80.00
Sutton.....	9			10	4,000.00	450.00
Warner.....	15			17	3,500.00	350.00
Webster.....	7			7	3,000.00	100.00
Wilnot.....	8	1		8	2,000.00	.....
Total.....	246	9	1	389	\$830,400.00	\$60,920.00



TABLE No. III.—MERRIMACK COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Allenstown .....	184	146	60	38	1	97	.....	2	.....	9	65	58	89	150	.....	6
Andover .....	112	97	132	97	4	223	.....	.....	.....	38	172	154	82	.....	.....	1
Boscawen, town ..	39	36	36	32	.....	67	1	.....	9	.....	59	52	88	.....	.....	.....
Boscawen, special	75	79	79	67	1	145	.....	.....	9	.....	117	109	92	.....	.....	.....
Bow .....	56	66	83	67	.....	150	.....	.....	.....	3	91	80	87	.....	.....	.....
Bradford .....	54	59	51	57	1	105	.....	.....	7	4	103	88	85	.....	.....	.....
Canterbury .....	54	64	62	60	3	113	6	.....	4	4	90	80	88	.....	10	.....
Chichester .....	41	44	57	52	3	104	2	.....	8	2	88	79	88	.....	.....	.....
Concord, town .....	93	82	71	55	6	118	2	.....	10	.....	123	107	87	.....	39	.....
Concord, Union ..	1,444	1,529	1,365	1,491	138	2,427	291	48	.....	.....	2,653	2,422	90	697	38	.....
Concord .....	163	167	180	182	.....	337	25	8	.....	.....	315	292	92	.....	.....	.....
Danbury .....	61	46	59	43	1	106	1	.....	.....	6	85	81	94	.....	2	.....
Dunbarton .....	33	37	40	44	.....	81	3	.....	9	.....	66	55	88	.....	.....	.....
Epsom .....	77	57	89	52	.....	141	.....	.....	.....	4	110	97	88	1	1	.....
Franklin .....	580	551	398	422	13	731	76	13	.....	.....	693	643	92	508	130	.....
Henniker .....	97	80	124	108	6	208	18	.....	.....	.....	177	160	90	.....	7	.....
Hill .....	50	45	52	50	1	98	3	.....	9	2	78	71	91	.....	.....	.....
Hooksett .....	160	163	127	89	1	212	3	.....	12	3	196	170	86	78	.....	.....
Hopkinton .....	122	120	141	127	5	247	16	3	.....	.....	229	203	88	.....	.....	.....
Loudon .....	59	66	60	64	2	120	2	.....	6	4	110	92	83	1	.....	3
Newbury .....	36	28	38	29	.....	67	.....	.....	9	2	57	49	85	.....	.....	.....
New London .....	50	50	56	58	1	113	.....	.....	.....	26	101	89	87	.....	.....	.....
Northfield .....	54	40	64	37	2	99	.....	.....	4	.....	68	59	87	.....	.....	.....
Pembroke .....	325	321	144	144	.....	288	.....	.....	3	27	225	202	89	230	.....	2
Pittsfield .....	198	185	252	221	.....	429	44	15	.....	.....	399	372	93	.....	.....	2
Salisbury .....	38	39	40	43	5	75	3	.....	.....	7	70	50	71	.....	.....	.....
Sutton .....	51	46	52	60	2	108	2	.....	6	11	89	83	93	.....	.....	.....
Warner .....	88	75	124	119	8	181	54	24	.....	.....	217	191	88	.....	1	1
Webster .....	36	29	41	29	.....	60	1	.....	1	1	68	58	85	.....	.....	.....
Wilnot .....	54	47	55	48	1	101	1	.....	.....	8	75	65	87	.....	.....	.....
Total .....	4,484	4,396	4,132	3,985	205	7,354	558	111	110	161	6,989	6,311	90	1,665	228	15

\* Between five and sixteen inclusive.

† Penacook district.



TABLE No. IV.—MERRIMACK COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Allenstown.....			5	\$48.00	1				
Andover.....			10	30.00	1	6	1		
Boscawen, town.....			5	30.33		2	1	2	
Boscawen, special.....			4	44.00	1		2		1
Bow.....	3	\$29.33	8	30.00		4	1		
Bradford.....	2	36.00	13	28.00		5			
Canterbury.....	1	32.00	12	31.00	2	4	1		
Chichester.....	2	34.00	8	30.00	2				
Concord, town.....			9	34.07		6			
Concord, Union.....			72	50.04		13	12	51	
Concord, Penacook.....			7	40.57	1		4	1	
Danbury.....			8	32.12	1	3			
Dunbarton.....			5	34.33	2				
Epsom.....			12	37.00	1				
Franklin.....			21	40.80	3		10	2	1
Henniker.....			9	32.00	2	1	4	1	
Hill.....			7	31.52		1	1	2	
Hooksett.....			9	37.79	1	2	3		3
Hopkinton.....			12	32.75	5		2		
Loudon.....			13	33.50	1	2	2		1
Newbury.....	1	26.66	5	25.53	1				
New London.....			5	35.20	1				1
Northfield.....			5	28.00	1				
Pembroke.....			12	31.76	3				
Pittsfield.....			12	36.60	2		5		1
Salisbury.....	1	28.00	8	26.50	2	3	1	2	
Sutton.....			13	29.00	1	3	1		
Warner.....			15	29.00	6		2	2	
Webster.....	1		6	28.20	3	2			
Wilnot.....	1	28.00	6	28.50	1	5			
Total.....	11	\$31.51	336	\$36.77	49	62	53	63	9

TABLE No. V.—  
(For the year ending  
REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Allentown ....	\$998.73	\$2,032.50		\$186.77	\$369.47	\$2.20	\$59.17		\$108.33
Andover .....	252.30	1,845.00		196.44	1,200.00	118.00	200.23	\$231.52	
Boscawen, town ..	71.34	809.05	\$290.00	69.96		75.00	53.07		
Boscawen, spec. ..	494.34	1,463.45	350.00	173.41	647.49		86.01		72.50
Bow .....	107.92	1,447.50		103.63	158.27	87.00	70.15		
Bradford .....	24.74	1,807.50		88.29	389.00	91.62	102.48		
Canterbury .....	547.28	1,777.50		84.58	313.82	85.00	86.62		
Chichester .....	22.11	1,290.00	500.00	144.33	200.00	110.00	55.51		
Concord, town. ....	1,311.50	3,376.98	500.00	230.87	514.51	202.00	132.98		250.00
Concord, Union ..	6,501.49	44,821.51	25,553.58	3,064.27		820.00	1,876.97		
Concord * .....	545.74	2,996.51	2,825.00	587.75	197.89		227.53		145.00
Danbury .....	39.81	1,020.00	100.00	219.27	217.98	72.00	78.08	133.16	183.33
Dunbarton .....	348.66	1,327.50		100.13	302.72	60.00	56.12		
Epsom .....	247.55	1,365.00	150.00	152.19		60.00	81.13		
Franklin .....	121.76	11,190.00	7,319.44	1,775.82			494.71		
Henniker .....		2,797.50	1,202.00	176.25		177.00	132.37		
Hill .....	341.77	690.00	250.00	181.12	249.37	31.00	70.76	95.79	183.33
Hooksett .....	648.15	2,700.00	150.00	194.22	465.68	105.00	129.32		
Hopkinton .....	456.78	3,630.00	500.00	388.18		187.65	158.60		250.00
London .....	720.77	2,220.00		409.38	193.70	110.00	81.13		
Newbury .....	278.45	1,192.50	107.50	80.00	60.00	47.50	52.46		
New London .....	747.82	1,620.00	479.13	80.99	1,000.00	89.50	90.89		180.00
Northfield .....	342.00	†2,070.00		51.00	133.38	60.00	61.00		
Pembroke .....	321.12	4,567.50	763.41	419.62	225.26		181.17		270.84
Pittsfield .....	677.27	4,125.00	3,175.00	609.86		94.88	251.32		270.83
Salisbury .....	94.69	982.50	200.00	48.15	300.00	62.45	48.80		
Sutton .....	172.43	1,170.00	500.00	190.50	494.66	67.60	90.28		
Warner .....	297.11	2,865.00	500.00	207.89		130.00	143.96		250.00
Webster .....	207.25	1,260.00		41.24	69.99	71.00	43.92		
Wilnot .....	51.31	900.00	300.00	12.60	304.00	32.25	81.74	106.52	
Total .....	\$16,992.19	\$111,360.00	\$45,715.06	\$10,268.71	\$7,998.19	\$3,048.65	\$5,287.48	\$566.99	\$2,164.16

\* Penacook district.

† Of this amount \$871.73 belonged to Northfield town; the balance to Union District, Tilton.

## MERRIMACK COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
		\$102.99		\$3,860.16						\$3,860.16
		218.00		4,270.49						4,770.49
\$50.08	\$135.00	62.66	\$6.76	1,622.92				\$500.00		1,622.92
166.64		113.34	45.00	3,612.18						3,612.18
		110.00		2,084.47						2,084.47
		13.72		2,508.35				100.00		2,608.35
24.80		118.00	31.25	3,068.85						3,068.85
		82.80		2,404.75						2,404.75
58.40	2.64	153.06	250.00	6,982.94						6,982.94
	35.02	2,031.54	3,859.50	88,563.88						88,563.88
192.72		135.82	508.49	8,362.45	\$983.00					9,345.45
110.00		137.01	52.50	2,363.14						2,363.14
		116.00		2,311.13				25.00		2,336.13
35.84		100.75	44.50	2,236.96				100.00		2,336.96
		602.40	450.00	21,954.13				1,221.84		23,175.97
		242.70	24.00	4,751.82				220.00		4,971.82
110.64		24.60	199.45	2,427.83					\$30.00	2,457.83
		239.41	23.20	4,654.98				150.00		4,804.98
		281.27	30.75	5,883.23				200.00	150.00	6,233.23
		195.00	25.00	3,954.98				100.00		4,054.98
		70.00		1,888.41						1,888.41
66.24		125.11	330.49	4,810.17	1,291.10					6,101.27
		75.38		2,792.76				200.00		2,992.76
		149.48	161.70	7,060.10	1,000.00	\$19,000.00			117.68	27,177.78
		90.80	500.81	9,795.77						9,795.77
45.28		86.60		1,868.47						1,868.47
31.31		130.87	33.10	2,880.75				50.00		2,930.75
		173.58		4,567.54						4,567.54
		109.40		1,892.80				50.00	100.00	1,952.80
66.72		74.20	31.25	1,960.59						1,960.59
\$958.67	\$172.66	\$6,166.49	\$6,607.75	\$217,307.00	\$3,274.10	\$19,000.00		\$2,916.84	\$397.68	\$242,895.62

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Allenstown .....	\$118.14	\$3.95	\$64.68	\$1,282.00	\$255.50	\$369.47	\$2.20	.....	\$128.50
Andover .....	90.74	10.00	105.70	2,163.60	.....	1,205.00	100.00	\$18.00	.....
Boscawen, town .....	10.56	.....	59.18	996.50	.....	*665.98	70.00	5.00	221.05
Boscawen, special .....	44.68	.....	128.73	1,573.70	145 00	.....	.....	.....	.....
Bow .....	103.63	.....	.....	1,479.00	.....	158.27	80.00	7.00	.....
Bradford .....	88.29	.....	.....	1,537.00	.....	380.00	85.62	6.00	7.15
Canterbury .....	25.95	.....	58.63	1,178.20	.....	313.82	75.00	10.00	48.40
Chichester .....	112.26	19.25	.....	1,413.60	.....	134.00	100.00	10.00	.....
Concord, town .....	208.10	.....	99.22	2,044.37	150.00	514.51	200.00	2.00	83.00
Concord, Union .....	3,018.95	.....	.....	49,104.66	2,000.00	.....	225.00	595 00	380.00
Concord, Penacook .....	312.11	.....	275.64	4,340.95	299.20	197.89	.....	†	.....
Danbury .....	197.18	.....	22.00	1,026.00	333.33	327.98	55.50	16.50	82.80
Dunbarton .....	75.00	.....	25.00	1,224.00	.....	302.72	60.00	.....	266.75
Epsom .....	152.19	.....	.....	1,511.00	.....	.....	45.00	15.00	31.00
Franklin .....	1,015.15	35.60	725.07	12,001.48	1,050.00	.....	.....	500.00	574.00
Henniker .....	102.57	.....	73 68	3,384.00	.....	.....	165.00	12.00	188.50
Hill .....	124.77	14.00	42 35	1,246.00	325 00	360.00	26.00	5.00	101.00
Hooksett .....	129.29	.....	64.93	2,721.00	.....	465.68	75.00	30.00	52.50
Hopkinton .....	181.88	31.78	174.52	2,899.65	500.00	.....	162.65	25.00	756.65
London .....	284.00	35.63	89.75	2,100.00	.....	193.70	100.00	10.00	119.40
Newbury .....	50.00	5.00	25 00	938.60	.....	60.00	41.50	6.00	78.30
New London .....	51.24	.....	29.75	1,481.00	360.00	1,037.00	80.00	9.50	433.25
Northfield .....	25 00	.....	26.81	956.45	.....	133.38	50.00	10.00	.....
Pembroke .....	296.89	18.10	104.63	2,599.60	527.78	1,725.26	.....	.....	.....
Pittsfield .....	456.28	.....	153.58	5,104.24	520.83	.....	79.88	15.00	26.00
Salisbury .....	38.15	.....	10.00	1,107.50	.....	280.90	62.45	.....	26.25
Sutton .....	132.15	1.50	56.85	1,839.75	.....	494.66	63.85	3.75	32.75
Warner .....	138.50	19.00	50.39	2,207.75	500.00	.....	120.00	10.00	834.30
Webster .....	7.80	.....	33.44	1,291.00	.....	69.99	71.00	.....	85.50
Wilmot .....	8.50	.....	4.10	791.00	.....	.....	24.25	8.00	90.50
Total .....	\$7,599.95	\$193.81	\$2,503.72	\$113,543.60	\$6,966.64	\$9,390.21	\$2,219.90	\$1,328.75	\$4,647.55

\* Both districts.

† Janitor acts as truant officer.

## MERRIMACK COUNTY.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	Rate of school assessment.	Average of current expenditure per pupil.
\$185.26		\$126.45	\$166.02	\$44.70	\$2,746.87			\$275.16	\$3,022.03	\$3.23	\$36.14
89.90	\$20.00	43.00	115.69	164.66	4,126.29			500.00	4,626.29	4.10	19.69
13.02		42.30	72.50	15.00	2,171.09				2,171.09	6.02	31.93
24.46	105.00	102.00	62.25	156.55	2,342.37				2,342.37	5.02	18.59
59.89		14.00	61.14	260.79	2,223.72				2,223.72	2.56	23.65
	30.00	50.25	62.25	33.18	2,279.74			63.13	2,342.87	4.29	19.99
104.57		9.75	69.00	39.40	1,932.72				1,932.72	3.89	20.74
163.43		32.00	104.90		2,089.44				2,089.44	6.18	22.42
219.25		50.00	164.75	171.80	3,907.00				3,907.00	5.47	29.38
6,115.53	892.00	5,900.00	4,715.87	12,590.83	85,537.84	\$8,000.00	\$8,032.50		101,570.34	6.85	32.24
543.93	25.00	453.96	575.08	246.69	7,270.45		483.00	318.48	8,071.93	8.97	23.08
20.15		18.75	26.00	56.28	2,183.16				2,183.16	4.90	23.47
18.00		37.50	81.50	14.00	2,104.47				2,104.47	4.31	28.06
			58.25	103.17	1,915.61				1,915.61	3.77	16.80
609.46	20.00	453.41	2,167.20	373.51	19,524.88			1,221.84	20,746.72	6.31	28.17
		214.50	273.85	78.50	4,492.60			223.78	4,716.38	5.98	25.38
37.25		69.56	81.37	45.01	2,477.31				2,477.31	5.71	27.83
134.69		108.10	176.45	103.75	4,061.39				4,061.39	3.79	19.25
204.60	10.00	179.30	171.67	110.09	5,407.79		75.12		5,482.91	4.89	23.61
100.00		66.50	125.00	10.00	3,233.98			125.00	3,358.98	5.65	26.95
20.00		26.30	46.25	40.00	1,336.95			120.00	1,456.95	3.12	19.66
119.23	100.00	139.50	168.90	50.80	4,060.17	1,657.30			5,717.47	3.18	31.97
159.97		1.50	48.00	30.88	1,441.99				1,441.99	6.84	20.03
188.94		171.92	324.19	212.58	6,169.89	1,000.00	245.00		7,414.89	6.39	24.20
171.78		443.45	499.01	381.72	7,851.77			412.54	8,264.31	5.61	19.65
45.45		25.00	45.75	14.50	1,655.95				1,655.95	3.62	21.51
114.96		47.63	46.50	38.98	2,873.33				2,873.33	4.75	27.11
80.70		42.25	192.08	50.00	4,244.97				4,244.97	4.65	19.56
20.00			60.00		1,638.73				1,638.73	4.46	23.41
		15.95	26.65	10.66	979.61			151.00	1,130.61	4.37	11.80
\$9,564.42	\$1,202.00	\$8,884.83	\$10,788.67	\$15,448.03	\$194,282.08	\$10,657.30	\$8,835.62	\$3,410.93	\$217,185.93	\$4.96	\$26.76

‡ On one thousand dollars of inventoried valuation.

TABLE No. I.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Atkinson.....	5	5	2	.....	35	30	32.40
Auburn.....	7	.....	1	.....	32	24	30.00
Brentwood.....	3	.....	.....	.....	36	36	36.00
Candia.....	8	.....	.....	.....	30	30	30.00
Chester.....	7	2	.....	.....	30	26	28.34
Danville.....	3	2	.....	.....	30	30	30.00
Deerfield.....	11	.....	2	2	31	23	24.63
Derry, town district.....	21	21	1	.....	36	*15	35.58
Derry, special district.....	2	2	.....	.....	36	36	36.00
East Kingston.....	3	.....	1	.....	34	34	34.00
Epping.....	4	4	.....	.....	36	36	36.00
Exeter.....	14	14	.....	.....	36	36	36.00
Fremont.....	5	2	.....	.....	30	21	26.04
Greenland.....	2	2	.....	.....	38	36	37.00
Hampstead.....	6	6	3	.....	36	36	36.00
Hampton.....	5	5	1	.....	36	33	34.92
Hampton Falls.....	3	.....	.....	.....	34	34	34.00
Kensington.....	3	.....	.....	.....	34	34	34.00
Kingston.....	5	5	.....	.....	34	34	34.00
Londonderry.....	9	.....	1	.....	36	30	30.62
Newcastle.....	2	2	.....	.....	38	38	38.00
Newfields.....	3	2	1	.....	36	36	36.00
Newington.....	2	2	.....	.....	38	38	38.00
Newmarket.....	10	10	.....	.....	37	36	36.30
Newton.....	4	4	.....	.....	35	35	35.00
North Hampton.....	3	2	.....	.....	37	37	37.00
Northwood.....	7	6	1	.....	31	26	29.94
Nottingham.....	7	.....	2	3	28	25	27.28
Plaistow.....	6	2	.....	.....	37	36	36.83
Portsmouth.....	39	39	1	.....	38	†36	38.00
Raymond.....	6	6	1	.....	36	24	28.00
Rye.....	4	.....	.....	.....	38	38	38.00
Salem.....	11	11	1	.....	39	37	37.99
Sandown.....	4	.....	.....	.....	28	22	25.00
Seabrook.....	8	4	.....	.....	35	30	34.37
South Hampton.....	3	.....	3	.....	25	24	24.06
Stratham.....	4	4	.....	.....	36	36	36.00
Windham.....	6	.....	3	.....	33	24	27.48
Total.....	255	164	25	5	.....	.....	32.42

\* Scholars conveyed.

† Diphtheria.



TABLE No. II.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1908.)

SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Atkinson.....	5	.....	.....	5	\$3,400.00	.....
Auburn.....	8	.....	.....	8	2,700.00	\$165.00
Brentwood.....	4	.....	.....	4	2,500.00	100.00
Candia.....	11	.....	.....	11	7,000.00	400.00
Chester.....	7	.....	.....	8	3,000.00	175.00
Danville.....	3	.....	.....	4	2,500.00	100.00
Deerfield.....	13	1	.....	13	10,000.00	200.00
Derry, town district.....	10	.....	.....	21	25,000.00	500.00
Derry, special district.....	1	.....	.....	2	7,000.00	1,000.00
East Kingston.....	4	.....	.....	4	4,200.00	200.00
Epping.....	8	.....	.....	10	6,000.00	100.00
Exeter.....	12	.....	.....	18	50,000.00	5,000.00
Fremont.....	5	.....	.....	5	3,000.00	150.00
Greenland.....	2	.....	.....	2	3,000.00	20.00
Hampstead.....	7	.....	.....	8	7,000.00	100.00
Hampton.....	4	.....	.....	6	10,000.00	900.00
Hampton Falls.....	4	.....	.....	4	3,000.00	80.00
Kensington.....	3	.....	.....	3	3,000.00	100.00
Kingston.....	5	.....	.....	5	3,500.00	70.00
Londonderry.....	9	.....	.....	9	9,000.00	300.00
Newcastle.....	2	.....	.....	2	2,700.00	150.00
Newfields.....	3	.....	1	4	6,400.00	100.00
Newington.....	1	.....	.....	2	.....	25.00
Newmarket.....	9	12	.....	17	14,725.00	200.00
Newton.....	4	.....	.....	5	6,200.00	60.00
North Hampton.....	2	.....	.....	4	5,500.00	112.00
Northwood.....	6	.....	.....	11	7,000.00	250.00
Nottingham.....	11	.....	.....	11	6,000.00	50.00
Plaistow.....	5	.....	.....	6	6,000.00	300.00
Portsmouth.....	12	1	.....	65	265,775.00	2,000.00
Raymond.....	10	.....	.....	11	5,000.00	50.00
Rye.....	4	.....	.....	4	12,500.00	1,000.00
Salem.....	9	.....	1	14	20,175.00	500.00
Sandown.....	4	.....	.....	4	600.00	150.00
Seabrook.....	6	.....	.....	8	6,000.00	300.00
South Hampton.....	4	.....	.....	4	4,600.00	.....
Stratham.....	4	.....	.....	4	3,800.00	100.00
Windham.....	7	.....	.....	7	5,000.00	200.00
Total.....	228	4	2	333	\$542,775.00	\$15,267.00



TABLE No. III.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant-officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Atkinson.....	32	35	38	41	1	77	1			16	64	57	89			
Auburn.....	50	44	59	52	5	105	1			2	93	84	89	1		
Brentwood.....	34	38	45	47	2	90			9		70	60	86		1	
Candia.....	83	77	100	85	3	178	4			5	143	125	87			
Chester.....	65	69	75	82		154	3			19	129	112	86			
Danville.....	47	51	50	45	1	94				13	83	73	90			
Deerfield.....	72	82	66	82		148			2	8	138	133	92		2	
Derry, town dist.	416	382	368	354	8	713	1			†75	622	535	86	2		
Derry, spec. dist.	37	45	40	34		73	1				59	52	88			
East Kingston..	48	24	39	26	1	64			5		65	56	86			
Epping.....	128	150	85	94	2	160	17				148	135	91	75		
Exeter.....	445	514	393	304	8	662	27	10			667	635	94		170	
Fremont.....	41	45	60	63	2	121				8	85	71	83	4		
Greenland.....	36	43	25	45		70			18		55	49	89			3
Hampstead.....	66	57	65	63		123	5				91	82	90			1
Hampton.....	83	85	111	102		189	24	28			181	157	87			
Hampton Falls.	33	26	27	29		56					44	43	97			
Kensington.....	27	32	34	39	1	72			2	5	59	49	83			
Kingston.....	95	85	97	71		168				30	144	125	86		10	
Londonderry...	129	121	127	125	2	249	1		1	9	196	165	84		1	
Newcastle.....	22	16	26	16		42			4		42	39	92			
Newfields.....	41	38	47	39	1	82	3		4	10	74	65	87			
Newington.....	36	25	28	23		51			8		49	43	87			1
Newmarket.....	280	291	201	190	1	363	27	10			328	301	91	159		
Newton.....	73	64	75	76	1	147	3			6	133	113	84		1	
North Hampton	47	43	48	40		87	1		18		76	67	88			
Northwood.....	116	65	94	82	1	174	1			21	145	135	92			
Nottingham.....	45	38	54	44	1	96	1		4		67	57	85			
Plaistow.....	93	92	100	98		198					161	141	88	2	1	
Portsmouth.....	956	1,026	849	881		1,555	175	50			1,585	1,448	91	450	6	4
Raymond.....	74	81	85	92		177				9	146	129	88	2		
Rye.....	65	67	72	79		151			19		124	108	87			
Salem.....	148	154	160	163		322	1		3	1	279	241	86			
Sandown.....	42	34	41	37		78				1	69	58	84	2		
Seabrook.....	147	135	143	122	1	262	2		7		210	178	85		2	
South Hampton	20	16	17	17	1	33				3	30	26	86			1
Stratham.....	59	61	57	47		101	3		6	11	97	91	93			
Windham.....	49	45	60	48	1	107				2	103	102	97	1		
Total.....	4,280	4,296	4,061	3,877	44	7,592	302	99	110	262	6,854	6,140	89	698	194	10

\* Between five and sixteen inclusive.

† Whole town.

TABLE No. IV.—ROCKINGHAM COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Atkinson			5	\$35.28				3	1
Auburn			2	28.00		4	1	1	
Brentwood			3	34.00					
Candia	1	\$40.00	16	32.57	3	1		1	
Chester			12	30.76	12	2	1		
Danville	1		5	35.33	12		12		
Deerfield	1	26.00	10	28.30	1	10			
Derry, town district	2	60.00	23	40.09	1		8	6	2
Derry, special district			2	42.00	1			1	
East Kingston			3	28.75					
Epping			6	41.00			1	1	
Exeter	1	66.66	17	40.69			4	2	1
Fremont			5	33.00		2	1		
Greenland			4	46.00				1	
Hampstead			6	31.08	2				
Hampton			5	36.40			1	1	3
Hampton Falls			4	30.66					
Kensington			3	28.00	2				
Kingston			5	31.60	1	1			
Londonderry	2	36.00	14	36.00	3		1		
Newcastle			2	40.00		1	1		
Newfields			3	37.53	1		2	1	
Newington			2	40.00			2		
Newmarket			10	42.40			4		
Newton			4	34.50	1				
North Hampton	1	48.00	3	43.50	1			1	1
Northwood	1	46.00	6	32.00	1				
Nottingham	1	28.00	6	29.33	2				
Plaistow			10	33.50		1	2		
Portsmouth			39	52.05	3		5	26	2
Raymond	2	64.00	8	36.66	2	3			2
Rye			4	44.00	1		1		
Salem			13	36.00	1		4		
Sandown			6	30.00		1			
Seabrook	1	36.00	7	31.50			1	1	
South Hampton			4	26.00			1		
Stratham			6	37.50	2				
Windham			9	32.00	1		1		
Total	13	\$46.97	299	\$37.33	34	26	44	46	12

TABLE No. V.—  
(For the year ending  
REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Atkinson .....	\$43.45	\$900 00	\$475.00	\$150.00	\$350.00	\$28.00	\$65.27	.....	\$150.00
Auburn .....	19.44	1,297.50	150.00	100.00	100.00	93.50	75.64	.....	.....
Brentwood .....	59.23	915.00	.....	99.29	207.00	41.00	65.88	.....	.....
Candia .....	538.23	1,635.00	300.00	138.00	105.00	105.00	114.68	.....	.....
Chester .....	80.34	1,417.50	100.00	135.69	289.00	102.50	100.65	.....	.....
Danville .....	108.48	615.00	235.00	64.78	240.00	35.00	64.66	\$109.28	.....
Deerfield .....	307.74	1,755.00	.....	149.00	48.27	85.00	120.78	191.12	.....
Derry, town .....	1,491.79	4,211.56	4,500.00	686.96	*700.00	186.25	452.01	.....	425.00
Derry, special .....	124.42	760.94	275.00	18.71	.....	.....	64.05	.....	75.00
East Kingstown .....	327.90	675.00	.....	27.66	37.18	40.00	50.63	.....	.....
Epping .....	342.10	2,205.00	1,200.00	.....	33.33	70.00	95.77	.....	275.00
Exeter .....	82.49	9,975.00	2,900.00	1,000.00	.....	297.00	497.76	.....	.....
Fremont .....	63.91	832.50	200.00	52.81	130.00	22.00	76.25	135.61	.....
Greenland .....	317.86	1,425.00	400.00	85.28	739.61	2.00	60.39	.....	100.00
Hampstead .....	342.73	1,192.50	1,100.00	120.34	.....	84.00	79.91	140.70	.....
Hampton .....	517.84	2,317.50	1,050.00	534.01	.....	75.00	118.95	.....	.....
Hampton Falls .....	26.51	862.50	.....	59.19	156.50	40.00	34.77	.....	.....
Kensington .....	5.84	720.00	125.00	73.20	87.00	30.00	46.36	.....	.....
Kingston .....	113.79	960.00	112.50	376.00	480.00	55.00	118.34	.....	.....
Londonderry .....	193.18	2,212.50	1,200.00	370.30	277.60	186.01	169.58	.....	.....
Newcastle .....	463.50	1,132.50	.....	55.33	255.00	25.00	†	.....	.....
Newfields .....	6.02	862.50	327.50	150.00	350.00	60.00	59.78	.....	.....
Newington .....	116.09	870.00	.....	34.25	120.00	.....	44.53	.....	100.00
Newmarket .....	820.71	3,922.50	4,000.00	463.56	100.00	100.00	259.25	.....	325.00
Newton .....	601.25	997.50	200.00	168.39	115.00	60.00	90.28	.....	.....
North Hampton .....	433.20	2,302.50	.....	175.26	442.00	55.00	62.22	.....	200.00
Northwood .....	382.78	1,815.00	200.00	223.89	488.30	96.73	117.73	127.78	.....
Nottingham .....	107.57	1,042.50	300.00	100.00	161.66	88.52	53.68	.....	.....
Plaistow .....	231.25	952.50	700.00	185.00	137.55	79.00	120.17	317.61	.....
Portsmouth .....	.....	34,012.50	8,487.50	.....	.....	.....	1,002.23	.....	.....
Raymond .....	601.79	1,687.50	387.50	181.81	199.68	43.00	134.20	.....	.....
Rye .....	761.51	3,127.50	400.00	312.37	706.66	70.00	95.77	.....	300.00
Salem .....	92.37	2,160.00	4,446.36	446.96	125.00	125.00	216.55	306.28	250.00
Sandown .....	13.06	480.00	100.00	18.38	10.00	29.00	50.02	63.07	.....
Seabrook .....	13.34	847.50	752.50	175.00	184.00	120.00	168.97	585.77	.....
South Hampton .....	12.11	540.00	110.00	17.74	45.00	17.72	18.91	.....	.....
Stratham .....	378.88	1,395.00	150.00	150.00	560.00	51.55	89.67	.....	150.00
Windham .....	57.59	1,012.50	287.50	100.00	94.00	94.00	61.61	.....	.....
Total .....	\$10,200.38	\$96,045.00	\$35,171.36	\$7,199.36	\$7,956.02	\$2,691.78	\$5,117.90	\$1,977.22	\$2,350.00

\* Whole town.

† Town treasurer refused to pay to schools.

ROCKINGHAM COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
.....	.....	\$110.00	\$6.50	\$2,278.22	.....	.....	.....	\$200.00	.....	\$2,478.22
.....	.....	147.57	.....	1,983.65	.....	.....	.....	50.00	.....	2,033.65
.....	.....	112.00	.....	1,499.40	.....	.....	.....	.....	.....	1,499.40
\$25.12	.....	196.57	.....	3,157.60	.....	.....	.....	200.00	.....	3,357.60
.....	.....	153.64	59.25	2,438.57	.....	.....	.....	100.00	.....	2,538.57
17.76	\$4.50	78.40	.....	1,572.86	.....	.....	.....	100.00	.....	1,672.86
41.44	201.07	.....	4.50	2,903.92	.....	.....	.....	.....	.....	2,903.92
*637.80	101.64	465.71	230.81	14,089.53	.....	.....	.....	.....	.....	14,089.53
.....	18.36	95.14	100.00	1,531.62	.....	.....	.....	.....	.....	1,531.62
.....	279.09	119.40	.90	1,557.76	.....	.....	.....	.....	.....	1,557.76
6.88	100.00	171.55	76.50	4,576.13	.....	.....	.....	100.00	\$100.00	4,776.13
.....	.....	380.57	477.50	15,610.32	.....	.....	.....	1,600.00	.....	17,210.32
.....	.....	11.00	.....	1,524.08	.....	.....	.....	150.00	.....	1,674.08
.....	35.00	85.20	2.00	3,252.34	.....	.....	.....	.....	.....	3,252.34
.....	.....	129.37	10.34	3,199.89	.....	.....	.....	.....	.....	3,199.89
.....	.....	122.10	841.00	5,576.40	.....	.....	.....	150.00	.....	5,726.40
.....	.....	91.80	5.50	1,276.77	.....	.....	.....	.....	.....	1,276.77
.....	.....	76.00	.....	1,163.40	.....	.....	.....	25.00	.....	1,188.40
.....	75.60	197.65	.....	2,488.88	.....	.....	.....	.....	.....	2,488.88
22.88	23.54	214.19	12.59	4,882.37	.....	.....	.....	.....	.....	4,882.37
.....	.....	.....	.....	1,931.62	.....	.....	.....	.....	.....	1,931.62
105.84	.....	80.26	60.00	2,061.90	.....	.....	\$5,169.09	.....	.....	7,230.99
.....	.....	61.80	.....	1,346.67	.....	.....	.....	.....	.....	1,346.67
.....	.....	226.90	330.60	10,448.52	.....	.....	.....	.....	.....	10,448.52
.....	.....	234.06	84.70	2,551.18	\$1,000.00	.....	.....	.....	25.00	3,576.18
.....	.....	110.42	.....	3,780.60	.....	.....	.....	.....	.....	3,780.60
122.48	81.00	128.20	70.50	3,854.39	.....	.....	.....	1,000.00	.....	4,854.39
47.04	.....	108.00	6.50	2,015.47	.....	.....	.....	300.00	.....	2,315.47
47.52	.....	187.50	6.00	2,964.10	.....	.....	.....	100.00	.....	3,064.10
.....	.....	838.10	2,594.52	46,934.85	.....	.....	.....	.....	.....	46,934.85
.....	.....	100.20	15.50	3,351.18	.....	.....	.....	.....	.....	3,351.18
.....	.....	163.20	458.97	6,395.98	.....	.....	.....	100.00	.....	6,495.98
41.76	9.31	358.62	34.50	8,594.39	500.00	.....	.....	250.00	.....	9,344.39
1.12	.....	48.81	.....	813.46	.....	.....	.....	150.00	.....	963.46
95.64	.....	115.90	.....	3,058.62	.....	.....	.....	.....	.....	3,058.62
.....	.....	1.20	8.00	770.68	.....	.....	.....	.....	.....	770.68
.....	.....	75.00	31.00	3,031.10	.....	.....	.....	.....	.....	3,031.10
.....	125.00	164.70	.....	1,996.90	.....	.....	.....	150.00	.....	2,146.90
\$1,213.28	\$1,054.11	\$5,960.73	\$5,528.18	\$182,465.32	\$1,500.00	.....	\$5,169.09	\$4,725.00	\$125.00	\$193,984.41

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Traut officers.	Transportation of pupils.
Atkinson.....	\$150.54			\$1,276.00	\$225.00	\$342.10	\$25.00	\$3.00	
Auburn.....	48.30		\$50.74	1,504.50		42.00	93.50		\$124.00
Brentwood.....	50.79		48.50	918.00		207.00	36.00	5.00	216.00
Candia.....	98.00	\$15.00	25.00	1,977.00		105.00	90.00	15.00	202.50
Chester.....	118.97		16.72	1,583.20		294.00	100.00	2.50	135.50
Danville.....	23.63		41.15	795.00		240.00	30.00	5.00	99.00
Deerfield.....	60.00		89.00	1,457.90		48.27	75.00	10.00	269.50
Derry, town district.....	420.24		215.54	7,711.50	850.00	1,030.00	136.25	50.00	20.00
Derry, special district.....			18.71	780.00	150.00		30.00		
East Kingston.....	15.24		12.42	735.00		37.18	40.00		225.00
Epping.....		110.32		2,448.72	504.24	33.33	45.00	25.00	815.00
Exeter.....	516.86	278.77	484.93	8,742.23			300.00	72.00	471.00
Fremont.....	36.92		15.14	955.80			40.00	7.00	
Greenland.....	33.65		51.63	1,082.00	200.00	739.61		2.00	400.00
Hampstead.....			120.34	1,858.50			79.00	5.00	
Hampton.....	350.00	50.00	134.01	3,619.98			75.00		412.00
Hampton Falls.....	59.19			782.00		156.50	40.00		114.05
Kensington.....		44.79	28.41	660.00		87.00	25.00	5.00	
Kingston.....	250.00		126.00	1,311.50		480.00	55.00		
Londonderry.....	216.39		153.91	2,439.00		277.60	171.01	15.00	
Newcastle.....	32.60	4.29	13.61	614.00		255.00	20.00	5.00	
Newfields.....	17.84		51.20	948.00		584.28	80.00		
Newington.....	18.61		15.64	791.00	200.00	120.00			
Newmarket.....	240.83		222.73	6,078.00	650.00		50.00	50.00	72.00
Newton.....	118.39		50.00	1,285.50			60.00		9.00
North Hampton.....	50.00	9.50	115.76	1,388.10	200.00	442.00	55.00		119.50
Northwood.....	131.93		91.96	1,447.40		488.30	78.98	17.75	599.50
Nottingham.....	32.81		40.00	1,354.00		161.66	75.00	13.52	92.00
Plaistow.....	85.00		96.62	1,851.00		137.55	75.00	4.00	
Portsmouth.....	1,569.46	651.20	999.25	31,140.25	1,850.00				140.00
Raymond.....	181.81			1,533.00	150.00	199.68	43.00		289.34
Rye.....	312.37			1,752.10	600.00	706.66	70.00		
Salem.....	301.62		145.34	3,938.70	374.96	106.68	125.00		361.00
Sandown.....	16.65		1.73	759.00		10.00	24.00	5.00	
Seabrook.....	109.06		32.55	2,186.50		184.00	70.00	50.00	
South Hampton.....	12.50		4.64	491.40		45.00	16.00	1.72	18.00
Stratham.....	65.00	22.50	66.89	1,341.20	325.00	560.00	51.55		
Windham.....	84.51			1,232.00		94.00	94.00		70.00
Total.....	\$5,829.71	\$1,186.37	\$3,585.10	\$102,828.98	\$6,279.20	\$8,214.40	\$2,473.29	\$368.49	\$5,273.89



ROCKINGHAM COUNTY.

July 15, 1908.)

ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	*Rate of school assessment.	Average of current expenditure per pupil.
\$167.00		\$16.75	\$60.10	\$44.43	\$2,309.92			\$200.00	\$2,509.92	\$6.19	\$28.87
41.49		14.35	53.35	22.93	1,995.16				1,995.16	4.17	21.00
18.09		3.00	43.10	16.22	1,561.70				1,561.70	4.19	20.26
24.00		13.75	72.77	13.00	2,651.02			152.90	2,803.92	5.69	17.98
		18.45	81.68	26.39	2,377.41			127.27	2,504.68	3.74	17.41
		11.60	44.96	46.36	1,336.64			115.80	1,452.44	4.37	13.92
10.00			73.75	15.00	2,108.42				2,108.42	4.08	14.25
601.69		582.03	616.88	907.41	13,141.54		\$80.00		13,221.54	6.86	18.85
74.66	\$60.00	104.25	96.44	28.03	1,342.09		100.00		1,442.18	4.82	22.75
2.89		20.25	65.27	10.79	1,164.04			143.90	1,307.94	3.88	16.63
88.93		108.50	157.70	56.82	4,393.56				4,393.56	4.40	29.69
	297.00	963.18	927.56	207.23	13,260.76			1,381.83	14,642.59	4.72	19.88
60.91			15.65	39.01	1,170.43				1,170.43	3.55	12.59
22.78		70.00	74.50	109.60	2,785.77				2,785.77	4.66	38.16
			157.57	150.17	2,370.58				2,370.58	5.61	26.05
124.37	42.00	40.41	92.00	47.97	4,987.74				4,987.74	3.91	27.56
8.50		30.00	59.50	8.50	1,258.24				1,258.24	3.24	28.60
25.00		12.00	70.00		957.20			50.00	1,007.20	3.28	14.50
10.00		30.00	100.00	30.00	2,392.50			60.00	2,452.50	5.97	13.75
78.94		44.50	154.14	138.89	3,749.38				3,749.38	4.70	18.20
45.22		62.85	72.70	26.40	1,156.70				1,156.70	4.44	25.15
25.08		55.30	155.43	103.95	2,021.08	\$5,169.09			7,190.17	6.42	22.96
		31.50		48.56	1,225.31				1,225.31	3.75	21.50
312.89	88.30	544.83	575.95	210.73	9,096.26				9,096.26	6.30	27.73
112.00		98.00	132.00	13.73	1,878.62	1,000.00	112.50		2,991.12	2.87	13.52
195.98		45.00	130.37	32.38	2,783.59				2,783.59	3.25	29.61
5.00	44.00	93.80	45.00	104.58	3,148.20		30.00	1,066.12	4,244.32	4.16	18.97
			17.12	10.97	1,797.08			203.22	2,000.30	3.49	25.31
85.00		101.75	143.25	19.25	2,598.42				2,710.42	3.84	15.37
2,372.21		3,349.40	3,009.12	1,735.83	46,816.72		5,000.00		51,816.72	4.60	29.53
61.65		78.82	87.33	57.77	2,682.40			11.25	2,693.65	4.78	17.30
194.33		86.95	239.42	128.24	4,090.07				4,090.07	4.13	28.60
139.98	110.00	438.80	305.24	339.79	6,687.11	252.61	48.00	178.35	7,166.07	5.32	23.62
6.05			18.35		840.78			150.00	990.78	3.66	12.01
63.95		6.00	173.00	80.80	2,955.86				2,955.86	4.91	13.62
35	22.50	3.65	36.75	2.77	655.28				655.28	3.29	19.55
21.54		75.71	274.50	18.70	2,822.59				2,822.59	4.59	24.76
98.42		38.25	48.57	20.18	1,779.93			62.90	1,842.83	3.92	16.95
\$5,098.90	\$663.80	\$7,193.63	\$8,481.02	\$4,873.32	\$162,350.10	\$6,421.70	\$5,270.50	\$4,115.63	\$178,157.93	\$4.47	\$22.47

\* On one thousand dollars of inventoried valuation.

TABLE No. I.—STRAFFORD COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOLS.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Barrington.....	11		3		31	25	29.00
Dover.....	34	34	1		37	37	37.00
Durham.....	5	5	1		36	36	36.00
Farmington, town district.....	4		1		36	36	36.00
Farmington, special district.....	5	5	1		40	36	37.00
Lee.....	3		1		35	34	34.66
Madbury.....	3		3		32	32	32.00
Middleton.....	3				24	24	24.00
Milton.....	10	7	2		36	35	35.90
New Durham.....	6		1		29	29	29.00
Rochester.....	26	25			37	37	37.00
Rollinsford.....	9	5	1		36	34	35.11
Somersworth.....	19	18	1		37	36	36.26
Strafford.....	11		5	4	30	27	28.00
Total.....	149	99	22	4			33.70



TABLE No. II.—STRAFFORD COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Barrington .....	12			12	\$6,000.00	\$50.00
Dover .....	13			49	250,000.00	4,000.00
Durham .....	6	12		8	10,000.00	500.00
Farmington, town .....	7			7	7,000.00	250.00
Farmington, special .....	4			8	28,000.00	1,200.00
Lee .....	3			3	3,000.00	300.00
Madbury .....	3			3	2,000.00	25.00
Middleton .....	4			4	500.00	5.00
Milton .....	9			13	12,000.00	600.00
New Durham .....	7			7	3,600.00	100.00
Rochester .....	8			43	140,000.00	1,000.00
Rollinsford .....	5			9	10,000.00	5,000.00
Somersworth .....	6			27	100,000.00	1,000.00
Strafford .....	13	2		13	4,400.00	150.00
Total .....	100	4		206	\$576,500.00	\$14,180.00

TABLE No. III.—STRAFFORD COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant officers' enumeration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tuition paid by town.	Pupils attending academy, tuition paid by town.	Average membership.	Average daily attendance.	Per cent. of attendance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Barrington.....	97	99	85	83	....	163	5	....	8	5	159	125	78	....	....	....
Dover.....	1,165	1,259	748	782	....	1,402	128	57	....	....	1,395	1,314	94	935	17	12
Durham.....	67	85	68	76	3	140	1	....	14	1	122	111	90	....	....	....
Farmington, town	27	22	30	26	....	55	1	....	9	3	42	37	88	....	....	....
Farmington, spec.	126	112	164	137	3	271	27	14	....	....	266	245	92	....	....	....
Lee.....	26	19	33	28	1	57	3	....	7	1	49	38	77	....	....	....
Madbury.....	30	28	34	28	....	61	1	....	2	3	50	46	90	....	....	....
Middleton.....	23	21	26	27	1	51	1	....	....	....	42	36	86	....	....	....
Milton.....	134	168	144	161	....	304	1	....	....	....	241	220	91	....	....	2
New Durham.....	40	58	67	39	1	105	....	....	6	....	87	75	85	....	....	....
Rochester.....	712	771	620	633	....	1,115	138	6	....	....	1,021	947	92	384	1	....
Rollinsford.....	163	178	175	176	1	350	....	....	21	8	250	232	93	....	....	8
Somersworth.....	672	729	394	395	....	739	50	....	....	....	670	632	94	599	....	....
Stratford.....	58	46	64	47	1	109	1	....	....	32	102	92	90	....	....	....
Total.....	3,340	3,595	2,652	2,638	11	4,922	357	77	67	53	4,496	4,150	92	1,918	18	22

\* Between five and sixteen inclusive.

TABLE No. IV.—STRAFFORD COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOL.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not gradu- ates of high school or academy.	Graduates of a nor- mal school.	Graduates of a train- ing school.	Graduates of a col- lege.
Barrington .....			11	\$28.00	4	3	1		
Dover .....	1	\$100.00	33	48.09	1		14	15	
Durham .....			8	43.46	2		5	2	
Farmington, town.			4	30.00	1				
Farmington, spec.	1	100.00	5	50.35			1		
Lee .....			3	32.00		2			
Madbury .....	1	32.00	3	33.33	1	1	1		
Middleton .....	1	28.00	3	30.00	1		1		
Milton .....	2	66.67	12	36.00	3		6		1
New Durham .....			6	30.00		1			
Rochester .....			27	42.96	6		23	2	2
Rollinsford .....			9	40.00	1		6		
Somersworth .....	1	90.00	18	49.00			1		
Strafford .....			13	26.00	2	3			
Total .....	7	\$69.05	155	\$39.94	22	10	59	19	3

TABLE No. V.—  
(For the year ending  
REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Barrington....	\$40.82	\$1,597.50	\$500.00	\$215.51	\$417.55	\$142.25	\$127.49	\$159.91	.....
Dover.....	209.84	31,560.00	1,690.00	1,900.00	.....	610.00	924.76	.....	.....
Durham.....	1,046.60	2,145.00	100.00	173.06	.....	55.00	99.43	.....	.....
Farmington*.	771.41	921.40	.....	160.00	327.00	133.00	51.67	.....	.....
Farmington†.	2,553.86	3,031.10	1,500.00	492.79	.....	234.53	168.53	.....	.....
Lee.....	528.67	1,057.50	.....	105.00	.....	60.00	44.53	.....	.....
Madbury.....	418.84	997.50	.....	39.83	103.25	45.00	31.72	.....	.....
Middleton.....	374.35	307.50	.....	18.62	.....	40.00	28.67	.....	.....
Milton.....	118.69	2,685.00	500.00	300.00	.....	159.30	193.37	.....	\$300.00
New Durham.	155.41	652.50	122.17	55.91	108.00	64.00	76.25	175.68	.....
Rochester....	70.97	15,232.50	8,267.50	.....	.....	200.00	776.53	.....	.....
Rollinsford....	761.03	4,125.00	1,100.00	340.21	879.72	50.00	200.69	.....	.....
Somersworth.	1 0,942.50	9,057.50	.....	.....	.....	190.00	550.83	.....	.....
Strafford.....	236.59	1,680.00	800.00	91.79	.....	87.00	93.94	.....	.....
Total.....	\$18,229.58	\$75,050.00	\$14,579.67	\$3,892.72	\$1,835.52	\$2,070.08	\$3,368.41	\$335.59	\$300.00

\* Town district.

† Special district.

STRAFFORD COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
\$285.08		\$260.50		\$3,746.61				\$150.00		\$3,896.61
		1,264.70	\$1,941.00	40,100.30				1,800.00		41,900.30
		162.60		3,781.69				100.00		3,881.69
182.96			924.93	3,472.37						3,472.37
		216.58	2,288.96	10,486.35				1,000.00		11,486.35
		74.04		1,869.74						1,869.74
	\$11.40	88.80		1,736.34				50.00		1,786.34
	20.00	122.87		912.01						912.01
	1,781.92	241.45	244.92	6,524.65				400.00		6,924.65
	180 00	143.60		1,733.52						1,733.52
		1,184.91	842.64	26,575.05			\$3,000.00	1,100.00		30,675.05
		168.80	9.23	7,634.68						7,634.68
	35.30	557.03	79.24	21,412.40						21,412.40
	60.00	137.00		3,186.32						3,186.32
\$468.04	\$2,088.62	\$4,622.88	\$6,330.92	\$133,172.03			\$3,000.00	\$4,600.00		\$140,772.03

TABLE No. VI.—  
For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Barrington.....	\$215.51			\$2,269.70		\$417.55	\$124.75	\$17.50	\$87.00
Dover.....	1,189.28	\$84.73	\$694.53	26,156.65	\$2,000.00		110.00	500.00	1,981.00
Durham.....				1,882.00		697.00	50.00	5.00	179.00
Farmington *.....	99.40	24.00	36.60	1,080.00		327.50	125.00	8.00	418.50
Farmington †.....	280.75	44.02	168.02	6,036.61			199.53	35.00	
Lee.....	65.00	15.00	25.00	900.00		368.82	60.00		
Madbury.....	29.12		10.71	798.00		103.25	45.00		34.80
Middleton.....	10.21		8.41	534.00			35.10	5.00	
Milton.....	200.00		79.27	3,875.67	600.00		137.65	21.65	514.45
New Durham.....			55.91	1,335.50		108.00	64.00		60.00
Rochester.....	616.77	300.00	641.22	15,555.57	1,070.77			200.00	3,606.00
Rollinsford.....	164.87		175.34	3,117.00		879.72	50.00		495.70
Somersworth.....	772.26		621.67	12,761.30				190.00	669.00
Strafford.....	29.50		62.29	1,966.00		559.90	75.00	12.00	143.00
Total.....	\$3,672.67	\$467.75	\$2,578.97	\$78,268.60	\$3,670.77	\$3,461.74	\$1,076.03	\$994.15	\$8,188.45

\* Town district.

† Special district.

STRAFFORD COUNTY.

July 15, 1908.)

ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	‡ Rate of school assessment.	Average of current expenditure per pupil.
.....	.....	.....	\$128.00	\$26.54	\$3,286.55	.....	.....	\$192.55	\$3,479.10	\$4.35	\$19.11
.....	\$9.00	\$2,688.59	3,577.75	1,446.62	40,438.15	.....	\$2,100.00	819.84	43,357.99	4.06	28.98
\$37.72	.....	155.90	151.10	95.10	3,252.82	.....	.....	362.56	3,615.38	4.88	23.73
20.95	.....	.....	95.00	91.00	2,325.95	.....	.....	.....	2,325.95	2.93	43.07
.....	30.00	831.50	578.05	280.11	8,483.50	.....	.....	926.46	9,410.05	5.47	31.89
.....	.....	16.00	72.15	5.00	1,526.97	.....	.....	.....	1,526.97	3.65	26.79
12.85	.....	.....	38.75	11.25	1,083.73	.....	.....	.....	1,083.73	4.31	19.52
.50	.....	.....	10.10	3.32	606.64	.....	.....	.....	606.64	2.34	14.44
.....	100.00	400.55	410.11	159.54	6,498.89	.....	.....	396.80	6,895.69	3.95	26.96
.....	.....	.....	48.82	14.69	1,686.92	.....	.....	.....	1,686.92	3.59	18.14
389.83	.....	1,828.77	1,384.46	1,060.99	26,654.38	\$3,000.00	391.42	1,100.00	31,145.80	5.82	26.11
8.32	50.00	292.00	248.97	195.43	5,677.35	.....	.....	208.97	5,886.32	5.01	20.35
.....	50.00	1,644.00	1,585.36	859.32	19,153.51	.....	.....	982.52	20,136.03	4.99	28.59
.....	.....	.....	88.43	.....	2,936.12	.....	.....	35.17	2,971.29	5.33	21.92
\$170.17	\$239.00	\$7,857.31	\$8,417.05	\$4,248.91	\$123,611.57	\$3,000.00	\$2,491.42	\$5,024.87	\$134,127.86	\$4.34	\$26.78

‡ On one thousand dollars of inventoried valuation.



TABLE No. I.—SULLIVAN COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLS BELOW HIGH SCHOOL.

TOWNS.	Public schools.	Graded schools.	Schools of twelve or less, more than six.	Schools of six scholars or less.	Greatest number of weeks in any school.	Least number.	Average number of weeks.
Acworth .....	5	..	4	.....	27	25	26.40
Charlestown .....	8	8	1	.....	34	34	34.00
Claremont .....	30	30	.....	.....	36	21	34.00
Cornish .....	12	.....	9	.....	30	*10	27.55
Croydon .....	12	.....	.....	.....	30	30	30.00
Goshen .....	3	.....	2	1	33	33	33.00
Grantham .....	3	2	1	.....	30	30	30.00
Langdon .....	2	2	.....	.....	32	26	29.25
Lempster .....	4	.....	.....	.....	30	28	29.00
Newport .....	14	14	.....	.....	36	33	34.90
Plainfield .....	8	.....	6	.....	30	*10	28.00
Springfield .....	7	.....	4	1	31	*11	23.00
Sunapee .....	8	8	2	.....	32	25	31.90
Unity .....	6	.....	3	1	30	25	29.16
Washington .....	6	.....	.....	4	31	*15	21.00
Total .....	118	64	32	7	.....	.....	30.44

\* Scholars conveyed.

TABLE No. II.—SULLIVAN COUNTY.

(For the year ending July 15, 1908.)

## SCHOOLHOUSES.

TOWNS.	Number of school-houses.	Reported unfit for use.	Built during the year.	Number of school-rooms.	Estimated value of school buildings, furniture, and sites.	Estimated value of apparatus.
Acworth.....	12	3		13	\$4,000.00	\$250.00
Charlestown.....	5			9	10,000.00	125.00
Claremont.....	17	1	1	37	70,000.00	150.00
Cornish.....	13			13	5,250.00	150.00
Croydon.....	4			4	1,000.00	75.00
Goshen.....	5			5	800.00	100.00
Grantham.....	2			3	1,500.00	150.00
Langdon.....	5	1		5	1,200.00	100.00
Lempster.....	6			6	2,000.00	150.00
Newport.....	9	1		18	50,000.00	1,500.00
Plainfield.....	14			15	3,000.00	25.00
Springfield.....	8			8	2,050.00	100.00
Sunapee.....	7			10	12,000.00	200.00
Unity.....	7			7	4,275.00	255.00
Washington.....	8			9	3,500.00	50.00
Total.....	122	6	1	162	\$170,575.00	\$3,380.00

TABLE No. III.—SULLIVAN COUNTY.

(For the year ending July 15, 1908.)

## SCHOLARS.

TOWNS.	* Truant off- icers' enu- meration.		Attended for two weeks.		Under five years.	Between five and sixteen.	Over sixteen years.	Non-resident pupils in high school.	Pupils attending high school, tu- tion paid by town.	Pupils attending academy, tuition paid by town.	Average mem- ber- ship.	Average daily at- tendance.	Per cent. of attend- ance daily.	In parochial schools.	In other private schools.	Not attending any school.
	Boys.	Girls.	Boys.	Girls.												
Acworth .....	43	33	47	34	2	76	3	.....	1	4	56	50	93	.....	.....	2
Charlestown .....	113	110	105	115	...	216	4	.....	.....	.....	199	187	94	.....	.....	...
Claremont .....	684	645	604	582	27	1,036	123	10	.....	.....	1,045	1,001	94	302	17	3
Cornish .....	78	61	94	79	6	164	3	.....	.....	.....	145	130	89	.....	6	.....
Croydon .....	23	17	24	17	...	36	5	.....	3	.....	37	33	89	.....	.....	.....
Goshen .....	17	16	22	14	1	33	2	.....	.....	.....	25	22	82	.....	.....	2
Grantham .....	35	23	29	25	...	53	1	.....	.....	.....	35	33	93	.....	.....	1
Langdon .....	28	21	29	20	.....	49	.....	.....	.....	.....	40	35	88	.....	.....	.....
Lempster .....	31	29	43	35	2	74	2	.....	3	2	61	57	93	.....	1	1
Newport .....	227	246	291	325	6	546	64	12	.....	.....	537	477	89	.....	.....	.....
Plainfield .....	73	61	73	85	1	155	2	.....	.....	31	105	87	83	.....	1	.....
Springfield .....	46	41	54	50	2	100	2	.....	.....	.....	104	82	79	.....	3	1
Sunapee .....	120	83	119	82	.....	197	4	.....	5	12	167	146	87	.....	.....	.....
Unity .....	52	33	62	39	1	99	• 1	.....	12	.....	72	62	86	.....	.....	.....
Washington .....	25	30	34	42	.....	76	.....	.....	.....	.....	76	61	80	.....	.....	.....
Total .....	1,595	1,449	1,630	1,544	48	2,910	216	22	14	59	2,704	2,463	91	302	28	10

\* Between five and sixteen inclusive.

TABLE No. IV.—SULLIVAN COUNTY.

(For the year ending July 15, 1908.)

## TEACHERS BELOW HIGH SCHOOLS.

TOWNS.	Number different men teachers.	Average wages per month.	Number different women teachers.	Average wages per month.	Number teaching first time.	Number not graduates of high school or academy.	Graduates of a normal school.	Graduates of a training school.	Graduates of a college.
Acworth.....			9	\$25.50	1	7			
Charlestown.....			9	37.73	1	3	1		
Claremont.....	1	\$94.45	29	42.15		1	13	2	
Cornish.....	1	40.00	17	24.40	3	3	2	2	1
Croydon.....			2	36.00	1		1		1
Goshen.....			5	24.00					
Grantham.....	1	40.00	2	33.38	1	1			1
Langdon.....			3	33.00	1		1		
Lempster.....			8	25.66	3	3			
Newport.....	1	32.00	14	36.57		1	2	2	2
Plainfield.....	1	34.00	13	26.62	3	7			
Springfield.....	1	28.00	9	28.00	1	6			1
Sunapee.....	1	34.50	7	35.50	1	1	2		1
Unity.....			9	23.44	2	4			
Washington.....			9	24.00		5			
Total.....	7	\$43.28	145	\$31.41	18	42	22	6	7

TABLE No. V.—  
(For the year ending  
REVE

TOWNS.	Balance from last year.	Amount required by law.	Additional amount voted.	Raised for books and supplies.	Raised for high school and academy tuition.	From town treasury, salaries of school officers.	Literary fund.	State appropriation under law of 1899.	
								Schools.	Superintendent.
Acworth.....	\$107.25	\$735.00	\$300.00	\$51.20	\$132.00	\$69.00	\$51.85	\$85.82	.....
Charlestown.....	619.31	2,442.50	2,057.50	300.00	.....	159.50	128.71	.....	\$195.00
Claremont.....	.....	9,637.00	8,000.00	.....	.....	32.70	667.34	.....	780.00
Cornish.....	18.31	1,447.50	400.00	74.50	.....	115.00	109.19	.....	.....
Croydon.....	389.29	540.00	.....	33.96	24.00	41.00	28.06	.....	.....
Goshen.....	81.83	435.00	.....	26.90	.....	33.50	25.62	.....	.....
Grantham.....	383.50	412.50	.....	17.74	.....	38.16	41.48	.....	.....
Langdon.....	184.42	532.50	200.00	21.78	10.00	.....	26.84	.....	50.00
Lempster.....	42.01	405.00	200.00	61.32	116.00	87.45	48.19	82.49	.....
Newport.....	60.59	5,895.00	8,131.50	780.95	.....	85.00	354.41	.....	450.00
Plainfield.....	600.00	1,470.00	.....	164.04	744.00	108.00	86.62	.....	.....
Springfield.....	156.56	450.00	250.00	48.59	25.00	34.00	55.51	137.83	.....
Sunapee.....	620.91	1,732.50	1,521.00	322.63	558.09	56.00	128.71	.....	270.00
Unity.....	144.67	547.50	200.00	82.72	55.34	36.00	73.81	119.44	.....
Washington.....	110.27	750.00	.....	75.00	.....	43.00	44.53	.....	.....
Total.....	\$3,518.92	\$27,432.00	\$21,260.00	\$2,061.33	\$1,664.43	\$938.31	\$1,870.87	\$425.58	\$1,745.00

## SULLIVAN COUNTY.

July 15, 1908.)

NUE.

Rebate from state for high school and academy tuition.	Local funds.	Dog licenses.	Miscellaneous (cur- rent).	Total of current rev- enue.	New buildings.			Repairs.	Miscellaneous.	Total revenue.
					Taxation.	Bonds.	Notes.			
\$13.60		\$59.20	\$1.75	\$1,606.67						\$1,606.67
	\$11.56	147.91	9.00	6,070.99						6,070.99
	6,200.00	643.20	300.00	26,260.24		\$20,000.00		\$700.00		46,960.24
		160.04	46.94	2,371.48				50.00		2,421.48
	48.44	83.10		1,187.85						1,187.85
		70.70		673.55				25.00		698.55
	14.20	86.40	22.09	1,016.07				75.00		1,091.07
		64.25		1,089.79						1,089.79
23.36	49.58	39.22		1,154.62				50.00	\$24.80	1,229.42
		381.10	898.95	17,037.50	\$4,761.80					21,799.30
	80.24	20.48		3,273.38				100.00		3,373.38
			98.50	1,255.99						1,255.99
158.32		165.57	170.00	5,703.73						5,703.73
	180.93	151.37		1,591.78						1,591.78
	25.00	85.00	30.00	1,162.80				125.00		1,287.80
\$195.28	\$6,609.95	\$2,157.54	\$1,577.23	\$71,456.44	\$4,761.80	\$20,000.00		\$1,125.00	\$24.80	\$97,368.04

TABLE No. VI.—  
(For the year ending  
EXPEND

TOWNS.	Text-books.	Maps and apparatus.	Scholars' supplies.	Teachers' salaries.	Superintendent.	High school tuition.	School board.	Truant officers.	Transportation of pupils.
Aeworth.....	\$19.41	.....	\$31.79	\$950.10	.....	\$132.00	\$60.00	\$9.00	\$213.60
Charlestown.....	175.00	\$70.00	125.00	2,900.00	\$350.00	.....	150.00	9.50	528.10
Claremont.....	1,311.25	100.00	500.00	15,608.50	780.00	.....	.....	32.70	2,102.50
Cornish.....	44.00	.....	30.50	1,813.50	.....	.....	105.00	10.00	146.50
Croydon.....	11.50	.....	22.46	498.90	.....	24.00	36.00	5.00	20.00
Goshen.....	21.26	.....	5.64	594.00	.....	.....	32.00	1.50	.....
Grantham.....	.....	.....	17.74	709.30	.....	.....	33.16	5.00	.....
Langdon.....	21.78	.....	.....	444.50	108.33	10.00	.....	.....	25.00
Lempster.....	35.31	5.20	20.81	704.50	.....	116.00	80.45	7.00	68.00
Newport.....	451.34	91.08	238.53	7,725.74	900.00	.....	85.00	.....	353.00
Plainfield.....	108.85	.....	55.19	1,679.20	.....	744.00	100.00	8.00	87.10
Springfield.....	29.92	.....	18.67	1,003.40	.....	25.00	30.00	4.00	23.05
Sunapee.....	215.39	.....	107.24	2,338.75	525.00	558.09	50.00	6.00	42.15
Unity.....	67.57	.....	15.15	998.00	.....	55.34	36.00	.....	.....
Washington.....	.....	.....	40.24	806.80	.....	167.42	38.00	5.00	88.00
Total.....	\$2,512.58	\$266.28	\$1,228.96	\$38,775.19	\$2,603.33	\$1,831.85	\$835.61	\$102.70	\$3,697.00



## SULLIVAN COUNTY.

July 15, 1908.)

## ITURES.

Minor repairs.	Insurance.	Janitors.	Fuel.	Miscellaneous (current).	Total of current expenses.	New buildings.	Interest and debt.	Permanent repairs.	Total expenditures.	* Rate of school assessment.	Average of current expenditure per pupil.
\$84.45		\$27.00	\$36.62	\$64.78	\$1,628.75				\$1,628.75	\$3.96	\$26.70
.....	\$82.00	315.75	469.94	147.68	5,322.97				5,322.97	5.96	26.75
382.29	244.00	1,042.12	1,386.90	1,524.92	25,015.18	\$31,100.00	\$302.82	\$1,300.00	57,718.00	4.32	23.94
155.51		27.55	111.87	37.31	2,481.74				2,481.74	3.50	16.01
6.50		9.25	28.50	12.55	674.66			9.25	683.91	2.45	16.86
53.32		9.00	36.75		753.47				753.47	3.69	30.14
.....		7.30	16.85	7.25	796.60			78.14	874.74	2.31	22.76
19.28		14.25	25.70	2.90	671.74				671.74	2.73	16.79
21.90		18.25	43.00	48.70	1,159.12			13.90	1,183.02	3.47	17.71
144.08		909.20	1,243.85	137.09	12,278.91	4,500.00	261.88		17,040.79	5.95	22.87
.....		45.68	72.25	109.79	3,010.06			178.37	3,188.43	2.59	22.14
9.90			30.57	8.00	1,182.51				1,182.51	3.52	11.37
28.56		205.45	317.41	262.47	4,656.51				4,656.51	3.50	25.31
5.00		10.50	79.00	63.50	1,330.06			64.48	1,394.54	3.23	17.97
.....	15.00	12.18	34.25		1,206.89				1,206.89	3.27	15.88
\$910.79	\$341.00	\$2,653.48	\$3,933.46	\$2,426.94	\$62,179.17	\$35,600.00	\$564.70	\$1,644.14	\$99,988.01	\$3.63	\$22.39

\* On one thousand dollars of inventoried valuation.



## APPENDIX C.

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All financial items refer to the fiscal year closed last prior to July 15, 1908. The dates vary with different towns and cities and nowhere agree with the close of the school year, or July 15, 1908.

## STATE SUMMARY.

No.		1907.	1908.	Increase.	Decrease.
TOWNS.					
1	Towns having organized schools....	232	232	.....	.....
DISTRICTS.					
2	Districts under special acts.....	26	26	.....	.....
SCHOOLS.					
3	Public schools.....	2,144	2,127	.....	17
4	Graded.....	1,162	1,234	72	.....
5	High schools.....	52	54	2	.....
6	Schools averaging twelve, or more than six.....	388	383	.....	5
7	Schools averaging six or less.....	130	117	.....	13
8	Average length of schools in weeks of five days.....	31.86	31.81	.....	.05
SCHOOLHOUSES.					
9	Number.....	1,777	1,762	.....	15
10	Number of schoolrooms.....	2,762	2,796	34	.....
11	Reported unfit for use.....	61	57	.....	4
12	Built during the year.....	11	9	.....	2
13	Estimated value of buildings, furniture and sites.....	\$5,062,996.00	\$4,961,115.59	.....	\$101,880.41
14	Apparatus.....	176,401.00	222,048.00	\$45,647.00	.....
SCHOLARS.					
Truant officers' enumeration:					
15	Between five and sixteen in- ) Boys.....	35,084	37,204	2,120	.....
16	clusive ) Girls.....	34,711	36,861	2,150	.....
17	Estimated percentage of total enumeration regularly attending some school.....	.....	94%	.....	.....
18	Boys attending two weeks or more.....	33,171	32,524	.....	647
19	Girls attending two weeks or more.....	32,039	31,512	.....	527
20	Number under five years.....	793	712	.....	81
21	Number between five and sixteen years.....	60,854	59,766	.....	1,088
22	Number over sixteen years.....	3,563	3,558	.....	5
23	Average membership of all.....	55,236	54,472	.....	764
24	Average attendance of all.....	49,663	49,398	.....	265
25	Average attendance to each school.....	23	23	.....	.....
26	Per cent. of attendance.....	90	90	.....	.....
27	Number in parochial schools.....	14,021	13,693	.....	328
28	Number in other private schools.....	550	620	70	.....
29	Whole number reported under 18, 19, 27, 28.....	79,781	78,349	.....	1,432
30	Number attending public high schools.....	5,302	5,546	244	.....
31	Pupils attending high schools, tuition paid by town.....	841	777	.....	64
32	Pupils attending academies, tuition paid by town.....	812	743	.....	69
TEACHERS (below high schools).					
33	Number of different men teachers.....	130	126	.....	4
34	Average wages per month.....	\$52.63	\$41.83	.....	\$10.80
35	Number of different women teachers.....	2,566	2,529	.....	37
36	Average wages per month.....	\$35.21	\$36.01	\$0.80	.....

STATE SUMMARY.—*Continued.*

No.		1907.	1908.	Increase.	Decrease.
	TEACHERS (below high schools). — <i>Continued.</i>				
37	Number teaching first time.....	349	347	.....	2
38	Number not graduates of high schools or academies.....	431	401	.....	30
39	Number normal school graduates..	500	471	.....	29
40	Number training school graduates..	400	384	.....	16
41	Number college graduates.....	90	76	.....	14
	HIGH SCHOOL TEACHERS.				
42	Men teachers.....	78	129	51	.....
43	Average salary of principal.....	\$1,075.00	\$1,219.98	\$144.98	.....
44	Women teachers.....	142	215	73	.....
45	Average salary.....	\$552.20	\$578.36	\$26.16	.....
	REVENUE.				
46	Balance from last year.....		\$107,858.76	.....	.....
47	Amount required by law.....	\$744,317.00	742,310.50	.....	\$2,006.50
48	Additional amount voted.....	394,463.00	381,586.58	.....	12,876.42
49	Raised for books and supplies.....	45,450.77	65,004.20	\$19,643.43	.....
50	Raised for high school and academy tuition.....		39,761.52	.....	.....
51	From town treasury, salaries of school officers.....		21,644.86	.....	.....
52	Literary fund.....	39,362.19	40,342.88	980.69	.....
	State appropriation under law of 1899:				
53	<i>a.</i> Schools.....	18,750.00	18,750.00	.....	.....
54	<i>b.</i> Superintendent.....	10,855.96	15,339.99	4,484.03	.....
55	Rebate from state for high school and academy tuition.....	8,000.00	8,000.00	.....	.....
56	Local funds.....	20,794.27	21,670.46	876.19	.....
57	Dog licenses.....	40,872.43	40,937.65	65.22	.....
58	Miscellaneous (current).....	59,544.54	48,612.68	.....	10,931.86
59	Total of current revenue.....	1,380,354.31	1,550,969.10	170,614.79	.....
	New buildings:				
60	From taxation.....		19,835.90	.....	.....
61	From sale of bonds.....		39,000.00	.....	.....
62	From district notes.....		31,744.09	.....	.....
63	Raised for permanent repairs and remodeling.....		36,633.52	.....	.....
64	Miscellaneous.....		5,952.43	.....	.....
65	Total revenue.....		1,683,535.04	.....	.....
	EXPENDITURES.				
66	Text-books.....	\$52,766.29	\$49,865.09	.....	\$2,901.20
67	Maps and apparatus.....	7,722.01	5,606.17	.....	2,115.84
68	Scholars' supplies.....	32,947.47	32,318.77	.....	628.70
69	Teachers' salaries.....	832,546.96	862,954.79	\$30,407.83	.....
70	Superintendent.....	40,628.43	43,621.98	2,993.55	.....
71	High school tuition.....	45,572.20	45,217.51	.....	354.69
72	Salaries of school boards.....	18,410.76	18,618.57	207.81	.....
73	Salaries of truant officers.....	5,846.43	6,562.96	716.53	.....
74	Transportation of pupils.....	42,393.52	47,929.86	5,536.34	.....
75	Minor repairs.....	36,379.12	35,330.80	.....	1,048.32
76	Insurance.....	6,553.99	4,882.37	.....	1,671.62
77	Janitors' salaries.....	63,529.29	65,933.94	2,404.65	.....
78	Fuel.....	73,976.93	88,945.78	14,968.85	.....
79	Miscellaneous (current).....	45,967.57	62,342.78	16,375.21	.....
80	Total of current expenses.....	1,325,240.97	1,370,131.37	44,890.40	.....

STATE SUMMARY.—*Continued.*

No.		1907.	1908.	Increase.	Decrease.
	EXPENDITURES.— <i>Continued.</i>				
81	Payments on new buildings .....	\$75,338.69	\$92,275.99	\$16,937.30	.....
82	Interest and debt .....	16,832.72	24,932.44	8,099.72	.....
83	Permanent repairs .....	35,180.90	52,833.74	17,652.84	.....
84	Total expenditures .....	1,452,593.28	1,540,173.54	87,580.26	.....
85	Rate of school assessment .....	4.51	4.50	.....	\$0.01
86	Average of current expenditure per pupil .....	23.99	24.08	.09	.....
87	Average expense per pupil, books and supplies .....	1.69	1.51	.....	.18

## APPENDIX D.

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I. Table showing for each district, equalized valuation per pupil; rate of school assessment; per capita expenditures; average general tax for five years preceding 1907 inclusive.

II. Table showing equalized valuation per pupil, rate of school assessment, and per capita expenditures in order.



TABLE No. I.

TOWNS.	Equalized valuation per pupil.	School tax.	Current expenditure per capita.	Average general tax for five years.
Acworth.....	\$5,658.00	\$3.96	\$26.70	\$18.20
Albany.....	7,844.00	3.19	20.69	21.30
Alexandria.....	5,062.00	3.16	20.67	22.44
Allentown.....	14,791.00	3.23	36.14	14.34
Alstead.....	5,531.00	2.96	21.05	14.32
Alton.....	5,600.00	5.24	29.68	23.45
Amherst.....	5,624.00	5.61	27.53	17.70
Andover.....	5,446.00	4.10	19.69	15.78
Antrim.....	4,765.00	7.78	28.45	22.53
Ashland.....	3,708.00	{ 6.31	21.44 }	20.58
		{ 5.19	16.39 }	
Atkinson.....	5,856.00	6.19	28.87	15.74
Auburn.....	6,347.00	4.17	21.00	16.52
Barnstead.....	5,367.00	4.62	18.74	20.86
Barrington.....	5,437.00	4.35	19.11	26.86
Bartlett.....	2,755.00	{ 3.47	12.92 }	18.68
		{ 6.86	12.66 }	
		{ 6.73	21.42 }	
Bath.....	5,261.00	{ 7.51	30.99 }	23.38
Bedford.....	9,736.00	3.37	28.77	15.44
Belmont.....	4,221.00	6.22	18.66	21.12
Bennington.....	4,812.00	6.87	18.76	19.00
Benton.....	4,900.00	2.99	15.05	16.80
Berlin.....	5,808.00	4.74	26.25	24.30
Bethlehem.....	9,069.00	{ 5.34	32.84 }	22.00
		{ 8.28	45.27 }	
		{ 6.02	31.93 }	
Boscawen.....	5,634.00	{ 5.02	18.59 }	22.80
Bow.....	10,970.00	2.56	23.65	12.95
Bradford.....	9,004.00	4.29	19.99	15.92
Brentwood.....	6,516.00	4.19	20.26	14.34
Bridgewater.....	7,229.00	2.90	20.91	17.56
Bristol.....	7,237.00	{ 3.46	19.39 }	22.12
		{ 4.92	24.91 }	
Brookfield.....	6,559.00	3.57	20.25	17.28
Brookline.....	5,905.00	2.96	18.07	17.22
Campton.....	4,837.00	4.60	18.50	20.70
Canaan.....	3,610.00	{ 5.41	15.11 }	17.44
		{ 5.51	18.43 }	
Candia.....	5,695.00	5.69	17.98	19.84
Canterbury.....	9,270.00	3.89	20.74	17.62
Carroll.....	8,590.00	3.29	20.99	16.00
Centre Harbor.....	7,696.00	3.41	22.64	16.74
Charlestown.....	4,925.00	5.96	26.75	16.88
Chatham.....	5,233.00	4.35	27.14	18.68
Chester.....	6,062.00	3.74	17.41	15.60
Chesterfield.....	6,262.00	3.28	14.93	15.08
Chichester.....	8,340.00	6.18	22.42	15.88
Claremont.....	4,024.00	4.32	23.94	22.00
Clarksville.....	6,076.00	4.13	19.73	15.10
Colebrook.....	4,958.00	{ 5.11	16.16 }	20.42
		{ 5.87	32.67 }	
Columbia.....	3,460.00	6.41	17.00	16.98
		{ 5.47	29.38 }	17.58
Concord.....	7,522.00	{ 6.85	32.24 }	21.34
		{ 8.97	23.08 }	25.22
Conway.....	3,046.00	6.11	16.76	19.42
Cornish.....	5,203.00	3.50	16.01	16.64
Croydon.....	7,296.00	2.45	16.86	15.20

TABLE No. I.—*Continued.*

TOWNS.	Equalized valuation per pupil.	School tax.	Current expenditure per capita.	Average general tax for five years.
Dalton.....	\$2,829.00	\$5.85	\$15.06	\$30.40
Danbury.....	5,115.00	4.90	23.47	19.28
Danville.....	3,834.00	4.37	13.92	17.62
Deerfield.....	5,674.00	4.08	14.25	19.34
Deering.....	7,428.00	3.34	28.25	17.80
Derry.....	3,782.00	6.86 4.82	18.85 22.75	25.14
Dorchester.....	2,886.00	3.95	17.87	28.70
Dover.....	9,658.00	4.06	28.98	19.80
Dublin.....	26,794.00	2.60	65.77	12.00
Dummer.....	5,959.00	4.73	17.98	18.18
Dunbarton.....	10,128.00	4.31	28.06	17.40
Durham.....	7,155.00	4.88	23.73	16.10
East Kingston.....	5,116.00	3.88	16.63	12.66
Easton.....	5,771.00	3.33	15.67	15.00
Eaton.....	2,420.00	5.27	16.28	23.28
Ervingham.....	3,108.00	3.68	15.85	19.40
Ellsworth.....	2,088.00	2.67	4.28	30.68
Enfield.....	4,330.00	6.36	22.88	24.74
Epping.....	7,255.00	4.40	29.69	18.62
Epsom.....	6,435.00	3.77	16.80	17.56
Errol.....	14,727.00	3.14	30.99	15.90
Exeter.....	6,243.00	4.72	19.88	19.84
Farmington.....	5,745.00	2.93 5.47	43.07 31.89	25.76
Fitzwilliam.....	4,563.00	4.88	22.21	17.40
Francestown.....	6,162.00	5.45	20.41	18.42
Franconia.....	8,803.00	4.01	30.56	18.00
Franklin.....	7,408.00	6.31	28.17	18.50
Freedom.....	4,275.00	2.91	15.40	18.84
Fremont.....	5,019.00	3.55	12.59	14.20
Gilford.....	5,960.00	3.93	19.14	17.35
Gilmanton.....	5,752.00	4.22	20.95	20.12
Gilsom.....	4,854.00	3.83	17.67	17.94
Goffstown.....	7,165.00	4.18 5.68	19.09 25.24	16.05
Gorham.....	2,802.00	6.42	19.00	20.60
Goshen.....	8,769.00	3.69	30.14	19.92
Grafton.....	3,771.00	3.68	13.56	18.94
Granham.....	5,382.00	2.31	22.76	17.82
Greenfield.....	6,243.00	5.39	18.46	19.90
Greenland.....	10,860.00	4.66	38.16	15.80
Greenville.....	8,684.00	4.54	24.34	16.00
Groton.....	3,688.00	4.07	19.59	27.34
Hampstead.....	5,676.00	5.61	26.05	17.00
Hampton.....	6,027.00	3.91	27.56	13.50
Hampton Falls.....	7,944.00	3.24	28.60	14.79
Hancock.....	7,644.00	4.07	28.05	15.46
Hanover.....	5,578.00	4.41 3.63	28.46 29.37	18.44
Harrisville.....	4,841.00	3.13	14.50	16.90
Hart's Location.....				11.12
Haverhill.....	3,293.00	8.49 6.94	21.03 20.00	24.20
Hebron.....	4,194.00	3.85	14.52	18.60
Henniker.....	7,471.00	5.98	25.38	19.36
Hill.....	5,027.00	5.71	27.83	20.00

TABLE No. I.—*Continued.*

TOWNS.	Equalized valuation per pupil.	School tax.	Current expenditure per capita.	Average general tax for five years.
Hillsborough.....	\$6,032.00	{ \$6.53 5.48	{ \$32.41 28.11	{ \$22.24
Hinsdale.....	3,869.00	7.06	27.62	24.20
Holderness.....	8,655.00	3.54	7.28	19.40
Hollis.....	5,078.00	3.91	24.05	16.10
Hooksett.....	6,529.00	3.79	19.25	14.64
Hopkinton.....	7,863.00	4.89	23.61	19.48
Hudson.....	6,058.00	3.69	25.29	16.84
Jackson.....	5,266.00	{ 4.72 2.55	{ 23.75 16.82	{ 16.80
Jaffrey.....	5,715.00	5.53	16.11	18.00
Jefferson.....	3,661.00	9.68	23.00	24.80
Keene.....	6,279.00	5.10	23.74	16.04
Kensington.....	5,793.00	3.28	14.50	15.40
Kingston.....	3,681.00	5.97	13.75	17.82
Laconia.....	6,927.00	5.26	26.36	23.26
Lancaster.....	4,363.00	{ 6.43 7.22	{ 12.39 24.53	{ 24.98
Landaff.....	4,870.00	3.52	13.43	15.90
Langdon.....	5,942.00	2.73	16.79	14.26
Lebanon.....	3,989.00	{ 5.08 7.40 8.87	{ 22.12 25.13 23.05	{ 22.66
Lee.....	11,966.00	3.65	26.79	12.96
Lempster.....	3,319.00	3.47	17.71	23.68
Lincoln.....	12,151.00	6.50	15.51	13.10
Lisbon.....	6,129.00	{ 4.73 8.67 3.46	{ 27.48 27.07 23.69	{ 25.92
Litchfield.....	16,429.00	4.06	40.13	10.50
Littleton.....	3,711.00	9.45	25.35	26.82
Londonderry.....	5,847.00	4.70	18.20	16.96
London.....	9,726.00	5.65	26.95	15.86
Lyman.....	3,492.00	3.67	14.82	19.04
Lyme.....	5,756.00	5.13	24.49	17.20
Lyndeborough.....	6,164.00	3.66	30.24	17.30
Madbury.....	9,509.00	4.31	19.52	12.22
Madison.....	3,772.00	4.54	24.12	22.56
Manchester.....	10,443.00	4.60	29.00	19.78
Marlborough.....	3,341.00	4.41	16.79	17.02
Marlow.....	6,321.00	3.05	20.36	16.60
Mason.....	4,565.00	2.13	24.07	13.96
Meredith.....	7,038.00	{ 4.66 4.64	{ 27.63 24.91	{ 22.26
Merrinack.....	9,209.00	4.50	37.96	15.39
Middleton.....	4,030.00	2.34	14.44	21.86
Milan.....	4,052.00	5.06	18.52	21.50
Milford.....	3,906.00	7.11	25.12	19.60
Milton.....	5,201.00	3.95	26.96	17.68
Monroe.....	4,380.00	3.04	18.73	12.78
Mont Vernon.....	10,107.00	3.28	21.10	15.60
Moultonborough.....	4,286.00	3.37	14.02	13.32
Nashua.....	7,323.00	4.87	28.42	21.06
Nelson.....	5,306.00	2.46	17.44	15.60
New Boston.....	8,650.00	4.31	29.69	17.48
Newbury.....	11,835.00	3.12	19.66	13.10
Newcastle.....	11,447.00	4.44	25.15	18.96

TABLE No. I.—*Continued.*

TOWNS.	Equalized valuation per pupil.	School tax.	Current expenditure per capita.	Average general tax for five years.
New Durham ..	\$4,277.00	\$3.59	\$18.14	\$25.50
Newfields ..	5,317.00	6.42	22.96	19.28
New Hampton ..	5,240.00	4.05	19.77	22.20
Newington ..	8,204.00	3.75	21.50	15.76
New Ipswich ..	6,843.00	3.81	25.90	16.38
New London ..	9,157.00	3.18	31.97	17.38
Newmarket ..	5,182.00	6.30	27.73	22.66
Newport ..	5,205.00	5.95	22.87	22.90
Newton ..	3,489.00	2.87	13.52	16.48
Northfield ..	14,319.00	6.84	20.03	20.30
North Hampton ..	14,154.00	3.25	29.61	13.79
Northumberland ..	3,772.00	6.06	21.91	20.64
Northwood ..	5,315.00	4.16	18.97	19.78
Nottingham ..	7,563.00	3.49	25.31	19.26
Orange ..	2,323.00	3.56	7.91	19.50
Orford ..	4,585.00	6.69	29.44	16.60
Ossipee ..	3,668.00	4.53	15.82	17.10
Pelham ..	4,997.00	3.81	18.87	13.60
Pembroke ..	8,837.00	6.39	24.20	16.62
Peterborough ..	7,362.00	3.52	25.02	16.96
Piermont ..	4,748.00	4.54	27.83	17.62
Pittsburg ..	12,104.00	2.85	17.36	13.94
Pittsfield ..	4,718.00	5.61	19.65	21.92
Plainfield ..	7,769.00	2.59	22.14	15.72
Plaistow ..	2,803.00	13.84	15.37	19.70
Plymouth ..	4,124.00	10.94	34.61	27.78
Portsmouth ..	9,347.00	4.60	29.53	25.46
Randolph ..	6,515.00	3.33	18.71	17.50
Raymond ..	5,493.00	4.78	17.30	21.90
Richmond ..	5,016.00	3.83	18.98	16.04
Rindge ..	9,093.00	4.03	27.95	14.14
Rochester ..	6,715.00	5.82	26.11	20.00
Rollinsford ..	6,466.00	5.01	20.35	13.98
Roxbury ..				13.58
Rumney ..	5,478.00	7.31	19.64	19.10
Rye ..	12,561.00	4.13	28.60	15.48
Salem ..	4,812.00	5.32	23.62	21.74
Salisbury ..	9,437.00	3.62	21.51	19.52
Sanbornton ..	6,227.00	3.52	18.66	18.28
Sandown ..	3,156.00	3.66	12.01	16.98
Sandwich ..	7,720.00	3.61	19.24	20.26
Seabrook ..	1,835.00	4.91	13.62	21.18
Sharon ..	14,585.00	1.55	28.66	17.30
Shelburne ..	8,715.00	2.91	17.80	12.40
Somersworth ..	7,997.00	4.99	28.59	19.48
South Hampton ..	7,700.00	3.29	19.55	15.04
Springfield ..	2,860.00	3.52	11.37	23.70
Stark ..	4,968.00	3.72	14.81	16.40
Stewartstown ..	2,889.00	{ 4.00	11.44	21.52
		{ 5.18	18.34	
Stoddard ..	5,396.00	3.37	13.60	17.52
Strafford ..	7,585.00	5.33	21.92	22.64
Stratford ..	1,910.00	9.96	19.89	21.58
Stratham ..	6,270.00	4.59	24.76	16.72
Sullivan ..	3,684.00	4.00	18.79	17.82
Sunapee ..	6,423.00	3.50	25.31	20.20
Surry ..	8,466.00	2.57	26.28	13.32

TABLE No. I.—*Continued.*

TOWNS.	Equalized valuation per pupil.	School tax.	Current expenditure per capita.	Average general tax for five years.
Sutton .....	\$6,818.00	\$4.75	\$27.11	\$17.16
Swansey .....	4,048.00	3.60	16.60	16.64
Tamworth .....	5,097.00	4.08	20.36	20.44
Temple .....	6,047.00	3.75	20.95	16.90
Thornton .....	5,884.00	8.51	91.14	25.36
Tilton .....	4,769.00	4.29	36.12	21.70
Troy .....	3,153.00	5.10	17.56	
Tuftonborough .....	5,503.00	4.82	19.33	17.48
Unity .....	3,785.00	3.12	35.92	17.70
Wakefield .....	4,774.00	3.23	17.97	16.94
Walpole .....	3,403.00	6.85	22.17	18.56
Warner .....	6,319.00	7.65	23.41	19.42
Warren .....	4,006.00	4.65	19.56	20.54
Washington .....	5,273.00	5.22	21.44	20.46
Weare .....	6,770.00	3.27	15.88	15.48
Webster .....	9,074.00	4.22	19.88	18.52
Wentworth .....	4,222.00	4.46	23.41	13.76
Wentworth's Location .....	9,272.00	5.25	20.24	20.56
Westmoreland .....	6,022.00	2.61	20.38	12.26
Whitefield .....	2,757.00	3.51	25.08	14.32
Wilmot .....	4,937.00	3.65	31.25	26.63
Wilton .....	4,769.00	10.16	20.61	
Winchester .....	3,425.00	4.37	11.80	21.38
Windham .....	4,505.00	6.44	25.97	19.10
Windsor .....	17,317.00	5.96	21.99	19.90
Wolfeboro .....	7,397.00	3.92	16.95	14.98
Woodstock .....	4,365.00	2.98	27.83	8.98
		4.09	25.82	21.63
		3.20	15.55	24.06

TABLE No. II.

EQUALIZED VALUATION PER PUPIL, JULY 15,  
1908, IN ORDER FROM LOWEST TO HIGHEST.

1	Seabrook,	\$1,835	46	Swansey,	\$4,048
2	Stratford,	1,910	47	Milan,	4,052
3	Ellsworth,	2,088	48	Plymouth,	4,124
4	Orange,	2,323	49	Hebron,	4,194
5	Eaton,	2,420	50	Belmont,	4,221
6	Bartlett,	2,753	51	Wentworth,	4,222
7	Whitefield,	2,757	52	Freedom,	4,275
8	Gorham,	2,802	53	New Durham,	4,277
9	Plaistow,	2,803	54	Moultonborough,	4,286
10	Dalton,	2,829	55	Enfield,	4,330
11	Springfield,	2,860	56	Lancaster,	4,363
12	Dorchester,	2,886	57	Woodstock,	4,365
13	Stewartstown,	2,889	58	Monroe,	4,380
14	Conway,	3,046	59	Windham,	4,505
15	Effingham,	3,108	60	Fitzwilliam,	4,563
16	Troy,	3,153	61	Mason,	4,565
17	Sandown,	3,156	62	Orford,	4,585
18	Haverhill,	3,293	63	Pittsfield,	4,718
19	Lempster,	3,319	64	Piermont,	4,748
20	Marlborough,	3,341	65	Antrim,	4,765
21	Walpole,	3,403	66	Tilton,	4,769
22	Winchester,	3,425	66	Wilton,	4,769
23	Columbia,	3,460	68	Wakefield,	4,774
24	Newton,	3,489	69	Bennington,	4,812
25	Lyman,	3,492	69	Salem,	4,812
26	Canaan,	3,610	71	Campton,	4,837
27	Jefferson,	3,661	72	Harrisville,	4,841
28	Ossipee,	3,668	73	Gilsum,	4,854
29	Kingston,	3,681	74	Landaff,	4,870
30	Sullivan,	3,684	75	Benton,	4,900
31	Groton,	3,688	76	Charlestown,	4,925
32	Ashland,	3,708	77	Wilmot,	4,937
33	Littleton,	3,711	78	Colebrook,	4,953
34	Grafton,	3,771	79	Stark,	4,968
35	Madison,	3,772	80	Pelham,	4,997
35	Northumberland,	3,772	81	Richmond,	5,016
37	Derry,	3,782	82	Fremont,	5,019
38	Unity,	3,785	83	Hill,	5,027
39	Danville,	3,834	84	Alexandria,	5,062
40	Hinsdale,	3,869	85	Hollis,	5,078
41	Milford,	3,906	86	Tamworth,	5,097
42	Lebanon,	3,989	87	Danbury,	5,115
43	Warren,	4,006	88	East Kingston,	5,116
44	Claremont,	4,024	89	Newmarket,	5,182
45	Middleton,	4,030	90	Milton,	5,201



91	Cornish,	\$5,203	143	Greenfield,	\$6,243
92	Newport,	5,205	145	Chesterfield,	6,262
93	Chatham,	5,233	146	Stratham,	6,270
94	New Hampton,	5,240	147	Keene,	6,279
95	Bath,	5,261	148	Warner,	6,319
96	Jackson,	5,266	149	Marlow,	6,321
97	Washington,	5,273	150	Auburn,	6,347
98	Nelson,	5,306	151	Sunapee,	6,423
99	Northwood,	5,315	152	Epsom,	6,435
100	Newfields,	5,317	153	Rollinsford,	6,466
101	Barnstead,	5,367	154	Randolph,	6,515
102	Grantham,	5,382	155	Brentwood,	6,516
103	Stoddard,	5,396	156	Hooksett,	6,529
104	Barrington,	5,437	157	Brookfield,	6,559
105	Andover,	5,446	158	Rochester,	6,715
106	Rumney,	5,478	159	Weare,	6,770
107	Raymond,	5,493	160	Sutton,	6,818
108	Tuftonborough,	5,503	161	New Ipswich,	6,843
109	Alstead,	5,531	162	Laconia,	6,927
110	Hanover,	5,578	163	Meredith,	7,038
111	Alton,	5,600	164	Durham,	7,155
112	Amherst,	5,624	165	Goffstown,	7,165
113	Boscawen,	5,634	166	Croydon,	7,206
114	Aeworth,	5,658	167	Bridgewater,	7,229
115	Deerfield,	5,674	168	Bristol,	7,237
116	Hampstead,	5,676	169	Epping,	7,255
117	Candia,	5,695	170	Nashua,	7,323
118	Jaffrey,	5,715	171	Peterborough,	7,362
119	Farmington,	5,745	172	Wolfeboro,	7,397
120	Gilmanton,	5,752	173	Franklin,	7,408
121	Lyme,	5,756	174	Deering,	7,428
122	Easton,	5,771	175	Henniker,	7,471
123	Kensington,	5,793	176	Concord,	7,522
124	Berlin,	5,808	177	Nottingham,	7,563
125	Londonderry,	5,847	178	Strafford,	7,585
126	Atkinson,	5,856	179	Hancock,	7,644
127	Thornton,	5,884	180	Centre Harbor,	7,696
128	Brookline,	5,905	181	South Hampton,	7,700
129	Langdon,	5,942	182	Sandwich,	7,720
130	Dummer,	5,959	183	Plainfield,	7,769
131	Gilford,	5,960	184	Albany,	7,844
132	Westmoreland,	6,022	185	Hopkinton,	7,863
133	Hampton,	6,027	186	Hampton Falls,	7,944
134	Hillsborough,	6,032	187	Somersworth,	7,997
135	Temple,	6,047	188	Newington,	8,204
136	Hudson,	6,058	189	Chichester,	8,340
137	Chester,	6,062	190	Surry,	8,466
138	Clarksville,	6,076	191	Carroll,	8,590
139	Lisbon,	6,129	192	New Boston,	8,650
140	Francestown,	6,162	193	Holderness,	8,655
141	Lyndeborough,	6,164	194	Greenville,	8,684
142	Sanbornton,	6,227	195	Shelburne,	8,715
143	Exeter,	6,243	196	Goshen,	8,769



# STATISTICAL TABLES.

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197	Franconia,	\$8,803	215	Manchester,	\$10,443
198	Pembroke,	8,837	216	Greenland,	10,860
199	Bradford,	9,004	217	Bow,	10,970
200	Bethlehem,	9,069	218	Newcastle,	11,447
201	Webster,	9,074	219	Newbury,	11,835
202	Rindge,	9,093	220	Lee,	11,966
203	New London,	9,157	221	Pittsburg,	12,104
204	Merrimack,	9,209	222	Lincoln,	12,151
205	Canterbury,	9,270	223	Rye,	12,561
206	Wentworth's Location,	9,272	224	North Hampton,	14,154
207	Portsmouth,	9,347	225	Northfield,	14,319
208	Salisbury,	9,437	226	Sharon,	14,585
209	Madbury,	9,509	227	Errol,	14,727
210	Dover,	9,658	228	Allenstown,	14,791
211	Loudon,	9,726	229	Litchfield,	16,429
212	Bedford,	9,736	230	Windsor,	17,317
213	Mont Vernon,	10,107	231	Dublin,	26,794
214	Dunbarton,	10,128			

AVERAGE OF CURRENT EXPENDITURE PER  
PUPIL, YEAR 1907-1908, IN ORDER FROM LOW-  
EST TO HIGHEST.

1 Ellsworth,	\$4.28	47 Marlborough,	\$16.79
2 Holderness,	7.28	49 Epsom,	16.80
3 Orange,	7.91	50 Jackson, special,	16.82
4 Springfield,	11.37	51 Croydon,	16.86
5 Stewartstown, town,	11.44	52 Windham,	16.95
6 Wilmot,	11.80	53 Columbia,	17.00
7 Sandown,	12.01	54 Raymond,	17.30
8 Lancaster, town,	12.39	55 Pittsburg,	17.36
9 Fremont,	12.59	56 Chester,	17.41
10 Bartlett, special,	12.66	57 Nelson,	17.44
11 Bartlett, town,	12.92	58 Tilton, special,	17.56
12 Landaff,	13.43	59 Gilsom,	17.67
13 Newton,	13.52	60 Lempster,	17.71
14 Grafton,	13.56	61 Shelburne,	17.80
15 Stoddard,	13.60	62 Dorchester,	17.87
16 Seabrook,	13.62	63 Unity,	17.97
17 Kingston,	13.75	64 Candia,	17.98
18 Danville,	13.92	64 Dummer,	17.98
19 Moultonborough,	14.02	66 Brookline,	18.07
20 Deerfield,	14.25	67 New Durham,	18.14
21 Middleton,	14.44	68 Londonderry,	18.20
22 Harrisville,	14.50	69 Stewartstown, West,	18.34
22 Kensington,	14.50	70 Canaan, special,	18.43
24 Hebron,	14.52	71 Greenfield,	18.46
25 Stark,	14.81	72 Campton,	18.50
26 Lyman,	14.82	73 Milan,	18.52
27 Chesterfield,	14.93	74 Boscawen, special,	18.59
28 Benton,	15.05	75 Belmont,	18.66
29 Dalton,	15.06	75 Sanbornton,	18.66
30 Canaan, town,	15.11	77 Randolph,	18.71
31 Plaistow,	15.37	78 Monroe,	18.73
32 Freedom,	15.40	79 Barnstead,	18.74
33 Lincoln,	15.51	80 Bennington,	18.76
34 Woodstock,	15.55	81 Sullivan,	18.79
35 Easton,	15.67	82 Derry, town,	18.85
36 Ossipee,	15.82	83 Pelham,	18.87
37 Effingham,	15.85	84 Northwood,	18.97
38 Washington,	15.88	85 Richmond,	18.98
39 Cornish,	16.01	86 Gorham,	19.00
40 Jaffrey,	16.11	87 Goffstown, town,	19.09
41 Colebrook, town,	16.16	88 Barrington,	19.11
42 Eaton,	16.28	89 Gilford,	19.14
43 Ashland, special,	16.39	89 Thornton,	19.14
44 Swanzey,	16.60	91 Sandwich,	19.24
45 East Kingston,	16.63	92 Hooksett,	19.25
46 Conway,	16.76	93 Troy,	19.33
47 Langdon,	16.79	94 Bristol, town,	19.39

95	Madbury,	\$19.52	148	Enfield,	\$22.88
96	South Hampton,	19.55	149	Newfields,	22.96
97	Warner,	19.56	150	Jefferson,	23.00
98	Groton,	19.59	151	Lebanon, West,	23.05
99	Rumney,	19.64	152	Concord, Penacook,	23.08
100	Pittsfield,	19.65	153	Walpole,	23.41
101	Newbury,	19.66	153	Webster,	23.41
102	Andover,	19.69	155	Danbury,	23.47
103	Clarksville,	19.73	156	Hopkinton,	23.61
104	New Hampton,	19.77	157	Salem,	23.62
105	Weare,	19.88	158	Bow,	23.65
105	Exeter,	19.88	159	Lisbon, Sugar Hill,	23.69
107	Stratford,	19.89	160	Durham,	23.73
108	Bradford,	19.99	161	Keene,	23.74
109	Haverhill, special,	20.00	162	Jackson, town,	23.75
110	Northfield,	20.03	163	Claremont,	23.94
111	Wentworth,	20.24	164	Hollis,	24.05
112	Brookfield,	20.25	165	Mason,	24.07
113	Brentwood,	20.26	166	Madison,	24.12
114	Rollinsford,	20.35	167	Pembroke,	24.20
115	Marlow,	20.36	168	Greenville,	24.34
115	Tamworth,	20.36	169	Lyme,	24.49
117	Wentworth's Location,	20.38	170	Lancaster, special,	24.53
118	Francestown,	20.41	171	Stratham,	24.76
119	Whitefield, special,	20.61	172	Bristol, special,	24.91
120	Alexandria,	20.67	172	Meredith, special,	24.91
121	Albany,	20.69	174	Peterborough,	25.02
122	Canterbury,	20.74	175	Westmoreland,	25.08
123	Bridgewater,	20.91	176	Milford,	25.12
124	Gilmanton,	20.95	177	Lebanon, special,	25.13
124	Temple,	20.95	178	Newcastle,	25.15
126	Carroll,	20.99	179	Goffstown, special,	25.24
127	Auburn,	21.00	180	Hudson,	25.29
128	Haverhill, town,	21.03	181	Nottingham,	25.31
129	Alstead,	21.05	181	Sunapee,	25.31
130	Mont Vernon,	21.10	183	Littleton,	25.35
131	Bath, town,	21.42	184	Henniker,	25.38
132	Ashland, town,	21.44	185	Wolfeboro,	25.82
132	Warren,	21.44	186	New Ipswich,	25.90
134	Newington,	21.50	187	Wilton,	25.97
135	Salisbury,	21.51	188	Hampstead,	26.05
136	Northumberland,	21.91	189	Rochester,	26.11
137	Strafford,	21.92	190	Berlin,	26.25
138	Winchester,	21.99	191	Surry,	26.28
139	Lebanon, town,	22.12	192	Laconia,	26.36
140	Plainfield,	22.14	193	Acworth,	26.70
141	Wakefield,	22.17	194	Charlestown,	26.75
142	Fitzwilliam,	22.21	195	Lee,	26.79
143	Chichester,	22.42	196	Loudon,	26.95
144	Centre Harbor,	22.64	197	Milton,	26.96
145	Derry, special,	22.75	198	Lisbon, special,	27.07
146	Grantham,	22.76	199	Sutton,	27.11
147	Newport,	22.87	200	Chatham,	27.14

201	Lisbon, town,	\$27.48	230	Portsmouth,	\$29.53
202	Amherst,	27.53	231	North Hampton,	29.61
203	Hampton,	27.56	232	Alton,	29.68
204	Hinsdale,	27.62	233	Epping,	29.69
205	Meredith, town,	27.63	233	New Boston,	29.69
206	Newmarket,	27.73	235	Goshen,	30.14
207	Hill,	27.83	236	Lyndeborough,	30.24
207	Piermont,	27.83	237	Franconia,	30.56
207	Windsor,	27.83	238	Bath, special,	30.99
210	Rindge,	27.95	238	Errol,	30.99
211	Hancock,	28.05	240	Whitefield, town,	31.25
212	Dunbarton,	28.06	241	Farmington, special,	31.89
213	Hillsborough, special,	28.11	242	Boscawen, town,	31.93
214	Franklin,	28.17	243	New London,	31.97
215	Deering,	28.25	244	Concord, Union,	32.24
216	Nashua,	28.42	245	Hillsborough, town,	32.41
217	Antrim,	28.45	246	Colebrook, special,	32.67
218	Hanover, town,	28.46	247	Bethlehem, town,	32.84
219	Somersworth,	28.59	248	Plymouth,	34.61
220	Hampton Falls,	28.60	249	Tuftonborough,	35.92
220	Rye,	28.60	250	Tilton, town,	36.12
222	Sharon,	28.66	251	Allenstown,	36.14
223	Bedford,	28.77	252	Merrimack,	37.96
224	Atkinson,	28.87	253	Greenland,	38.16
225	Dover,	28.98	254	Litchfield,	40.13
226	Manchester,	29.00	255	Farmington, town,	43.07
227	Hanover, special,	29.37	256	Bethlehem, special,	45.27
228	Concord, town,	29.38	257	Dublin,	65.77
229	Orford,	29.44			

RATE OF SCHOOL ASSESSMENT ON \$1,000, 1908,  
IN ORDER FROM LOWEST TO HIGHEST.

1	Sharon,	\$1.55	49	Bedford,	\$3.37
2	Mason,	2.13	49	Moultonborough,	3.37
3	Grantham,	2.31	49	Stoddard,	3.37
4	Middleton,	2.34	52	Centre Harbor,	3.41
5	Croydon,	2.45	53	Bristol, town,	3.46
6	Nelson,	2.46	53	Lisbon, Sugar Hill,	3.46
7	Jackson, special.	2.55	55	Bartlett, town,	3.47
8	Bow,	2.56	55	Lempster,	3.47
9	Surry,	2.57	57	Nottingham,	3.49
10	Plainfield,	2.59	58	Cornish,	3.50
11	Dublin,	2.60	58	Sunapee,	3.50
12	Wentworth's Location,	2.61	60	Westmoreland,	3.51
13	Ellsworth,	2.67	61	Landaff,	3.52
14	Langdon,	2.73	61	Peterborough,	3.52
15	Pittsburg,	2.85	61	Sanbornton,	3.52
16	Newton,	2.87	61	Springfield,	3.52
17	East Kingston,	2.88	65	Holderness,	3.54
18	Bridgewater,	2.90	66	Fremont,	3.55
19	Freedom,	2.91	67	Orange,	3.56
19	Shelburne,	2.91	68	Brookfield,	3.57
21	Farmington, town,	2.93	69	New Durham,	3.59
22	Alstead,	2.96	70	Swanzy,	3.60
22	Brookline,	2.96	71	Sandwich,	3.61
24	Windsor,	2.98	72	Salisbury,	3.62
25	Benton,	2.99	73	Hanover, special,	3.63
26	Monroe,	3.04	74	Lee,	3.65
27	Marlow,	3.05	74	Whitefield, town,	3.65
28	Newbury,	3.12	76	Lyndeborough,	3.66
28	Tuftonborough,	3.12	76	Sandown,	3.66
30	Harrisville,	3.13	78	Lyman,	3.67
31	Errol,	3.14	79	Eppingham,	3.68
32	Alexandria,	3.16	79	Grafton,	3.68
33	New London,	3.18	81	Goshen,	3.69
34	Albany,	3.19	81	Hudson,	3.69
35	Woodstock,	3.20	83	Stark,	3.72
36	Allenstown,	3.23	84	Chester,	3.74
36	Unity,	3.23	85	Newington,	3.75
38	Hampton Falls,	3.24	85	Temple,	3.75
39	North Hampton,	3.25	87	Epsom,	3.77
40	Washington,	3.27	88	Hooksett,	3.79
41	Chesterfield,	3.28	89	New Ipswich,	3.81
41	Kensington,	3.28	89	Pelham,	3.81
41	Mont Vernon,	3.28	91	Gilsum,	3.83
44	Carroll,	3.29	91	Richmond,	3.83
44	South Hampton,	3.29	93	Plaistow,	3.84
46	Easton,	3.33	94	Hebron,	3.85
46	Randolph,	3.33	95	Canterbury,	3.89
48	Deering,	3.34	96	Hampton,	3.91

588 SUPERINTENDENT OF PUBLIC INSTRUCTION.

96	Hollis,	\$3.91	150	Greenland,	\$4.66
98	Windham,	3.92	150	Meredith, town,	4.66
99	Gilford,	3.93	152	Londonderry,	4.70
100	Dorchester,	3.95	153	Exeter,	4.72
100	Milton,	3.95	153	Jackson, town,	4.72
102	Acworth,	3.96	155	Dummer,	4.73
103	Stewartstown, town,	4.00	155	Lisbon, town,	4.73
103	Sullivan,	4.00	157	Berlin,	4.74
105	Franconia,	4.01	158	Sutton,	4.75
106	Rindge,	4.03	159	Raymond,	4.78
107	New Hampton,	4.05	160	Derry,	4.82
108	Dover,	4.06	160	Troy,	4.82
108	Litchfield,	4.06	162	Nashua,	4.87
110	Groton,	4.07	163	Durham,	4.88
110	Hancock,	4.07	163	Fitzwilliam,	4.88
112	Deerfield,	4.08	165	Hopkinton,	4.89
112	Tamworth,	4.08	166	Danbury,	4.90
114	Wolfeboro,	4.09	167	Seabrook,	4.91
115	Andover,	4.10	168	Bristol, special,	4.92
116	Clarksville,	4.13	169	Somersworth,	4.99
116	Rye,	4.13	170	Rollinsford,	5.01
118	Northwood,	4.16	171	Boscawen, special,	5.02
119	Auburn,	4.17	172	Milan,	5.06
120	Goffstown, town,	4.18	173	Lebanon, town,	5.08
121	Brentwood,	4.19	174	Keene,	5.10
122	Gilmanton,	4.22	174	Tilton, Union,	5.10
122	Weare,	4.22	176	Colebrook, town,	5.11
124	Bradford,	4.29	177	Lyme,	5.13
124	Tilton, town,	4.29	178	Stewartstown, West,	5.18
126	Dunbarton,	4.31	179	Ashland, special,	5.19
126	Madbury,	4.31	180	Warren,	5.22
126	New Boston,	4.31	181	Alton,	5.24
129	Claremont,	4.32	182	Wentworth,	5.25
130	Barrington,	4.35	183	Laconia,	5.26
130	Chatham,	4.35	184	Eaton,	5.27
132	Danville,	4.37	185	Salem,	5.32
132	Wilmot,	4.37	186	Strafford,	5.33
134	Epping,	4.40	187	Bethlehem, town,	5.34
135	Hanover, town,	4.41	188	Greenfield,	5.39
135	Marlborough,	4.41	189	Canaan, town,	5.41
137	Newcastle,	4.44	190	Francestown,	5.45
138	Webster,	4.46	191	Concord, town,	5.47
139	Merrimack,	4.50	191	Farmington, special,	5.47
140	Ossipee,	4.53	193	Hillsborough, special,	5.48
141	Greenville,	4.54	194	Canaan, special,	5.51
141	Madison,	4.54	195	Jaffrey,	5.53
141	Piermont,	4.54	196	Amherst,	5.61
144	Stratham,	4.59	196	Hampstead,	5.61
145	Campton,	4.60	196	Pittsfield,	5.61
145	Manchester,	4.60	199	Loudon,	5.65
145	Portsmouth,	4.60	200	Goffstown, special,	5.68
148	Barnstead,	4.62	201	Candia,	5.69
149	Warner,	4.65	202	Hill,	5.71

203	Rochester,	\$5.82	231	Bath, town,	\$6.73
204	Dalton,	5.85	232	Northfield,	6.84
205	Colebrook, special,	5.87	233	Concord, Union,	6.85
206	Newport,	5.95	233	Wakefield,	6.85
207	Charlestown,	5.96	235	Bartlett, special,	6.86
207	Winchester,	5.96	235	Derry, town,	6.86
209	Kingston,	5.97	237	Bennington,	6.87
210	Henniker,	5.98	238	Haverhill, special,	6.94
211	Boscawen, town,	6.02	239	Hinsdale,	7.06
212	Northumberland,	6.06	240	Milford,	7.11
213	Conway,	6.11	241	Lancaster, special,	7.22
214	Chichester,	6.18	242	Rumney,	7.31
215	Atkinson,	6.19	243	Lebanon, high school,	7.40
216	Belmont,	6.22	244	Bath, special,	7.51
217	Newmarket,	6.30	245	Walpole,	7.65
218	Ashland, town,	6.31	246	Antrim,	7.78
219	Franklin,	6.35	247	Bethlehem, special,	8.28
220	Enfield,	6.36	248	Haverhill, town,	8.49
221	Pembroke,	6.39	249	Thornton,	8.51
222	Columbia,	6.41	250	Lisbon, high school,	8.67
223	Gorham,	6.42	251	Lebanon, West,	8.87
223	Newfields,	6.42	252	Concord, Penacook,	8.97
225	Lancaster, town,	6.43	253	Littleton,	9.45
226	Wilton,	6.44	254	Jefferson,	9.68
227	Lincoln,	6.50	255	Stratford,	9.96
228	Hillsborough, town,	6.53	256	Whitefield, special,	10.16
229	Meredith, special,	6.64	257	Plymouth,	10.94
230	Orford,	6.69			





## APPENDIX E.

# SCHOOL OFFICERS

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HENRY C. MORRISON, *State Superintendent of Public Instruction,*  
Concord.

JAMES E. KLOCK, PH. D., *Principal State Normal School,*  
Plymouth.

## *Superintendents of Cities.*

CHARLES W. BICKFORD.....	Manchester.
LOUIS J. RUNDLETT.....	Concord.
JAMES H. FASSETT.....	Nashua.
ERNEST L. SILVER.....	Portsmouth.
GEORGE A. KEITH.....	Keene.
AUSTIN H. KEYES.....	Dover.
JOSEPH H. BLAISDELL.....	Laconia.
ANDREW JACKSON.....	Rochester.
GEORGE H. WHITCHER.....	Berlin.
WILLIAM H. SLAYTON.....	Franklin.
ROYAL E. GOULD.....	Somersworth.

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## *Superintendents of Supervisory Districts.*

AUSTIN H. FITTZ.....	Troy, Fitzwilliam, Rindge, Jaffrey, P. O. East Jaffrey.
CHANNING FOLSOM.....	Newmarket, Epping, Stratham, P. O. Newfields, R. F. D.
EVERETT T. WHITFORD....	Pittsfield, Pembroke, Allenstown.
LOUIS DEWITT RECORD...	Walpole, Westmoreland.
H. L. MOORE.....	Wolfeboro, Tuftonborough, Alton.
WILLIAM H. CUMMINGS...	Claremont, Charlestown.
THOMAS A. ROBERTS.....	Lebanon, Plainfield.
FRANK S. SUTCLIFFE.....	Newport, New London.
JOHN BACON.....	Milford, Wilton, Amherst.
CLARENCE E. BAKER.....	Derry, Raymond.
CHANNING T. SANBORN....	Wakefield, Milton, P. O. Union.
O. H. ADAMS.....	Greenland, North Hampton, Newington, Durham.
FRANK C. JOHNSON.....	Hillsborough, Antrim, Peterborough.
GEORGE W. SUMNER.....	Penacook, Boscawen (Special), Hill.
D. F. CARPENTER.....	Orford, Warren, Piermont, Hanover (Town District).
WILLARD B. ATWELL.....	Stratford, Colebrook (Special District), Northumberland, Columbia.
JAMES A. MACDOUGALL....	Warner, Hopkinton, Concord (Town District), P. O. Contoocook.
JACOB E. WIGNOT.....	Salem, Atkinson, Hudson.
FORDYCE T. REYNOLDS....	Woodsville, Haverhill, Bath.
SAMUEL A. BURLEIGH....	Meredith, Ashland (Special), Holderness.
EUGENE TUTTLE.....	Campton, Woodstock, Rumney.
ERNEST COBB.....	Tilton, Northfield.
HENRY H. PRATT.....	Swanzy, Dublin, Hinsdale.

## TOWN AND CITY SCHOOL BOARDS.

TOWN.	NAME.	Post-office address when different from town.
Acworth.....	Miss Esther R. Chatterton..	
	Almon E. Clark.....	East Acworth.
	Lyman E. Young.....	South Acworth.
Albany.....	James H. Annis.....	Passaconaway.
	Archie Nickerson.....	Pequaket.
	Charles E. Lyman.....	Conway.
Alexandria.....	A. F. Cheney.....	R. F. D. No. 1, Bristol.
	Fred A. Tucker.....	R. F. D. No. 1, Bristol.
	Mark Linfield.....	R. F. D. No. 1, Bristol.
Allenstown.....	Mrs. Etta M. Stearns....	Suncook.
	F. D. Clement.....	
	C. E. Wade.....	
Alstead.....	Charles L. Linsley.....	Alstead Center.
	C. J. Newell.....	
	George A. Mayo.....	East Alstead.
Alton.....	Arthur D. Rollins.....	West Alton.
	Mrs. Alta H. McDuffee..	
	Albert J. Jones.....	
Amherst.....	Aaron M. Wilkins.....	
	Mrs. Sophia E. Dodge....	
	William W. Sloan.....	
Andover.....	James F. Morton.....	
	George H. McKeage.....	East Andover.
	George W. Stone.....	
Antrim.....	Charles F. Butterfield..	
	Henry A. Hurlin.....	
	Mrs. Charlotte M. Harvey.	
Ashland (Town)....	J. E. Sanborn.....	
	Mrs. W. C. Currier.....	
	G. W. Lambert.....	
Ashland (Special)...	Dana W. Carey.....	
	Ora A. Brown.....	
	Willis F. Hardy.....	
	Charles H. Pattee.....	
	John H. Morrill.....	
	L. S. Record.....	
Atkinson.....	Herbert N. Sawyer.....	R.F.D.No.2,Haverhill,Mass.
	Harry I. Noyes.....	Westville.
	Charles I. Pressy.....	Atkinson Depot.
Auburn.....	Lewis G. Shattuck.....	
	Mrs. Lillian C. Cutting..	
	Mrs. Aletta M. Davis....	
Barnstead.....	Coran K. Davis.....	North Barnstead.
	Frank G. Foss.....	Center Barnstead.
	Enos George.....	
Barrington.....	Miss Annie L. Wentworth.	R. F. D. No. 4, Dover.
	Mrs. Linna M. B. Locke..	North Barrington.
	Mrs. Anna G. Weeks.....	R. F. D. No. 1, Rochester.
Bartlett (Town)....	Frank Cannell.....	Glen.
	John Dinsmore.....	Lower Bartlett.
	Horace Beane.....	Kearsarge.
Bartlett (Special)...		
	Fred Perkins.....	
	G. K. Howard.....	
Bath (Town).....	Charles M. Hibbard.....	R. F. D., Woodsville.
	Mrs. Sarah M. Nutter....	R. F. D., Woodsville.
	Harry Woods.....	R. F. D., Woodsville.

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TOWN.	NAME.	Post-office address when different from town.
Bath (Special).....	Clayton C. Foster .....	
	Albert H. Clough.....	
	Benjamin A. Stymest.....	
Bedford.....	Rodney F. Rollins.....	R. F. D. No. 7, Manchester.
	Milton N. Flint.....	R. F. D. No. 8, Manchester.
	Mrs. Fannie L. Shepard..	R. F. D. No. 8, Manchester.
Belmont.....	Rev. E. S. Moulton.....	
	A. F. Rogers.....	R. F. D., Laconia.
	James C. Hill.....	
Bennington.....	Mrs. Martha E. Knight..	
	George F. Myhaver.....	
	Allen Gerrard.....	
Benton.....	William W. Eastman.....	
	George H. Clark.....	
	Durward W. Hutchins...	
Berlin.....	Dr. Louis B. Marcou....	
	Daniel J. Daley.....	
	Henry M. Moffett.....	
Bethlehem (Town)..	John Whyte.....	Piercebridge.
	W. C. Bartlett.....	
Bethlehem (Special)..	George T. Cruft.....	R. F. D. No. 3, Whitefield.
	Miss Cynthia A. Kidder...	Maplewood.
	Herbert S. Knowles.....	
Boscawen (Town)...	Mrs. Alla J. Carter.....	
	Ervin A. Griffin.....	R. F. D. No. 13.
	Miss Alice G. Adams.....	
Boscawen (Special)..	Almon G. Harris.....	Penacook.
	Edson H. Mattice.....	Penacook.
	Rev. Whitman Bassett...	Penacook.
Bow.....	A. Sterling Colby.....	R. F. D., Hooksett.
	Dr. Frank E. Colby.....	R. F. D. No. 3, Concord.
	Mrs. Perley A. Clough...	R. F. D. No. 3, Concord.
Bradford.....	Roswell W. Cummings...	
	Frank O. Melvin.....	
	George W. W. Cressy...	
Brentwood.....	John F. Swasey.....	Exeter.
	Mrs. Mabel G. Snyder...	Exeter.
	Warren M. Thyng.....	Epping.
Bridgewater.....	Bradley T. Nichols.....	R. F. D. No. 2, Plymouth.
	John L. Morrison.....	R. F. D. No. 2, Plymouth.
	David T. Atwood.....	R. F. D. No. 2, Plymouth.
Bristol (Town).....	Charles E. Kimball.....	R. F. D. No. 2.
	Hiram T. Heath.....	
	C. E. Jewell.....	
Bristol (Special)...	Frank N. Gilman.....	
	Albro Wells.....	
	Roswell Cutler.....	
	Mrs. Ada B. Cavis.....	
	Mrs. Mabel Ladd.....	
	Ira A. Chase.....	
Brookfield.....	Arthur L. Sceggel.....	R. F. D. No. 1, Sanbornville.
	Mrs. Florence L. Eaton...	R. F. D. No. 1, Sanbornville.
	Mrs. Alice E. Churchill...	R. F. D. No. 1, Sanbornville.
Brookline.....	George L. Dodge.....	
	Mrs. Abbie V. Bennett...	
	George H. Nye.....	
Campton.....	George D. Pattee.....	R. F. D. No. 3, Plymouth.
	Mrs. Clara J. Pulsifer...	R. F. D. No. 3, Plymouth.
	Mrs. Annie S. Little.....	Campton Village.

TOWN.	NAME.	Post-office address when different from town.
Canaan (Town).....	George U. Proal..... James B. Wallace..... I. B. Stevens.....	West Canaan.
Canaan (Special)....	Miss Flora B. Day..... Mrs. Cora B. Smith..... Frank B. Clarke.....	
Candia.....	Charles F. Flanders..... Benjamin F. Lang..... Mrs. Lucie A. E. Holt.....	R. F. D. No. 1. East Candia.
Canterbury.....	Frank L. Brown..... Mrs. Charles E. True..... Rev. Dyer M. Phillips.....	Uplands. R. F. D. No. 10, Loudon.
Carroll.....	Mrs. Flora J. Miles..... Mrs. Georgianna Nelson..... Calvin Rines.....	Twin Mountain. Twin Mountain. Twin Mountain.
Center Harbor.....	Albert E. Hutchins..... James R. Lovett..... George W. Greene.....	Meredith.
Charlestown.....	George H. Stoughton..... George I. Putnam..... Wesley A. Hunt.....	
Chatham.....	Mrs. Lucretia H. Chandler. Mrs. Florrie M. Locke.... Clarence W. Bryant.....	North Charlestown. North Chatham. South Chatham.
Chester.....	Miss Martha T. Larnard.. George A. Hosley..... Mrs. Lizzie S. Hook.....	
Chesterfield.....	Merrick F. Chandler..... Herbert Morgan..... Mrs. Ella S. Puffer.....	Spofford. West Chesterfield.
Chichester.....	Sam B. Munsey..... Mrs. Elizabeth N. Shaw.... Otis T. Maxfield.....	
Claremont.....	Arthur L. Fitch..... Frank H. Foster..... Herbert B. Converse.....	Pittsfield.
Claremont (Stevens High School).....	John S. Walker..... Dr. H. C. Sanders..... William W. Cushman..... Charles P. Rossiter.....	
Clarksville.....	Noah F. Kidder..... Frank L. Bumford..... Edson F. Chase.....	Pittsburg. Beecher's Falls, Vt.
Colebrook (Town)...	Arthur H. Brackett..... Rev. A. H. Reed..... Sherburn R. Ramsay.....	
Colebrook (Special)...	Dr. E. E. Jones..... Fred Vancore..... Darwin Lombard..... Charles O. Stevens..... D. S. Pease..... Ira A. Ramsey.....	
Columbia.....	Michael Gray..... William E. Cone..... Mrs. Tina J. Gray.....	Colebrook. Colebrook. Colebrook.
Concord (Town)....	Albert Saltmarsh..... Judson F. Hoyt..... Irving T. Chesley.....	Box 557. Route No. 11, Penacook. Route No. 1.

TOWN.	NAME.	Post-office address when different from town.
Concord (Union)...	Hon. E. N. Pearson.....	
	Mrs. Alice M. Nims.....	
	Dr. George M. Kimball....	
	George H. Moses.....	
	Rev. John Vannevar.....	
	Dr. D. E. Sullivan.....	
	Mrs. Ella H. J. Hill.....	
	Mrs. Fanny Minot.....	
Concord (Penacook) .	Eben Hutchinson.....	
	Dr. H. C. Holbrook.....	Penacook.
	Henry A. Brown.....	Penacook.
Conway.....	Harry G. Rolfe.....	Penacook.
	Mrs. Abbie M. D. Blouin...	Conway Center.
	Arthur E. Kenison.....	North Conway.
Cornish.....	George B. Reed.....	
	Herbert Deming.....	Cornish Center.
	George L. Deming.....	R. F. D. No. 4, Windsor, Vt.
Croydon.....	Miss Margaret Beaman...	R. F. D. No. 3, Windsor, Vt.
	Albert I. Barton.....	
	George A. Wright.....	Croydon Flat.
Dalton.....	Fred W. Putnam.....	
	Mrs. J. B. Sampson.....	R. F. D. No. 2, Whitefield.
	Mrs. William Britton.....	R. F. D. No. 2, Lancaster.
Danbury.....	Herbert W. Blakslee.....	R. F. D. No. 2, Whitefield.
	Wilbur W. Webster.....	South Danbury.
	Mrs. Nellie F. Edson.....	
Danville.....	Charles S. Taylor.....	
	Alfred B. Sargent.....	North Danville.
	Sidney W. Huntington....	South Danville.
Deerfield.....	Clarence M. Collins.....	South Danville.
	Edgar C. Hoague.....	
	J. H. Prescott.....	Deerfield Center.
Deering.....	A. M. Chase.....	R. F. D., Gossville.
	Dennis R. Chase.....	East Deering.
	Mrs. Edith A. Smith.....	Hillsborough.
Derry (Town).....	George F. Ellsworth.....	
	Mrs. Annie B. Shepard....	
	Dr. Alexander B. Wark....	
Derry (Special).....	Ernest L. Abbott.....	
	Joseph B. Bartlett.....	
	Charles A. Sefton.....	Derryville.
Dorchester.....	Mrs. Helen D. Hood.....	Derryville.
	Mrs. Lydia M. Schoolcraft..	Cheever.
	William S. Sewell.....	
Dover.....	Herbert H. Ashley.....	
	George J. Foster.....	Cheever.
	Charles E. Wendell.....	
	Edna F. Rines.....	
	Ellen T. Scales.....	
	George Buzzell.....	
	Dr. Charles A. Fairbanks...	
	Allen P. Richmond, Jr.....	
	John E. Anthes.....	
	James N. Whelan.....	
	Andrew Killoren.....	
	George D. McDuffee.....	
	James H. Southwick.....	
	Frederick E. Smith.....	
	Rev. George E. Hall.....	
	James F. Dennis.....	



TOWN.	NAME.	Post-office address when different from town.
Dublin.....	Milton D. Mason..... Fred C. Gowing.....	
Dummer.....	Archie R. Garfield..... Mrs. Daniel R. Wight..... James E. Nichols..... Mrs. Edith E. Lovejoy.....	R. F. D., Peterborough. R. F. D. No. 1, Milan. West Milan. West Milan.
Dunbarton.....	F. L. Ireland..... David Story..... Miss Annie M. Burnham.....	R. F. D. No. 1, Goffstown. R. F. D. No. 1, Goffstown. R. F. D. No. 2, Concord.
Durham.....	Charles S. Langley..... Fred W. Morse.....	
East Kingston.....	Joseph F. Currier..... Joseph F. Kimball..... Mrs. Laura O. Philbrick.....	
Easton.....	Mrs. Katherine Bowles..... A. T. Young..... Mrs. Stella Coombs.....	
Eaton.....	David M. Thurston..... Eugene W. Hatch..... Luther E. Dearborn.....	R. F. D., Conway Center.
Efingham.....	Sherman U. Cutting..... William M. Fulton..... Eugene Tewksbury.....	R. F. D. No. 1, Centerville. Efingham Falls. Efingham Falls.
Ellsworth.....	Mrs. Lizzie E. Avery..... Mrs. Della F. Leeman..... Mrs. Ida J. Avery.....	
Enfield.....	William E. Larkin..... Frank T. Currier..... George F. Pettingill.....	Enfield Center.
Epping.....	Fred P. Knox..... Dr. A. W. Mitchell..... William Mason.....	
Epsom.....	Mrs. Rosilla E. Hall..... Walter H. Tripp..... Charles A. Brown.....	R. F. D., Gossville. Short Falls. Short Falls.
Errol.....	Lewis C. Hsley..... F. B. Brooks..... N. N. Ferren.....	Lakeside.
Exeter.....	Clarence Getchell..... Miss Frances E. Smith..... Albion Burbank.....	
Farmington (Town) ..	George A. Davis..... Eugene H. Thompson..... Clara A. Wyatt.....	R. F. D. No. 2, Rochester. R. F. D. No. 2, Rochester.
Farmington (Special) ..	Arthur H. Wiggin..... Mrs. Lizzie M. Carter..... Willis C. Chandler.....	
Fitzwilliam.....	Dr. George S. Emerson..... Mrs. Lilly C. Howes.....	
Francetown.....	Annie S. Clark..... Dr. Edwin D. Stevens..... Edwin W. H. Farnum.....	
Franconia.....	Dr. H. L. Johnson..... C. E. Whipple..... W. A. Brooks.....	
Franklin.....	Omar A. Towne..... Miss Mary A. Proctor..... Rev. L. W. Phillips.....	

TOWN.	NAME.	Post-office address when different from town.
Freedom.....	Manson B. Godfrey..... George W. Lougee..... Charles H. Andrews.....	
Fremont.....	Walter H. Lyford..... James B. Martin..... Alden F. Sanborn.....	Epping. R. F. D. No. 1, Epping. R. F. D. No. 1.
Gilford.....	Mrs. Julia M. Rand..... Charles E. Curtis..... Edwin P. Jewett.....	R. F. D. No. 1, Lakeport. Lakeport. R. F. D. No. 4, Laconia.
Gilmanton.....	Mary A. Wight..... Mrs. Alice A. Morgan..... Frank N. Merrill.....	R. F. D. No. 4, Pittsfield. R. F. D. No. 3, Laconia.
Gilsum.....	Francis C. Minor..... Mrs. Arabelle E. Crain..... Mrs. Mary A. Hammond...	R. F. D., Surry.
Goffstown (Town)...	George Pattee..... George E. Whitney..... Lucien T. Bartlett.....	R. F. D. No. 3, Manchester. Grasmere.
Goffstown (Special)...	Dr. Frank Blaisdell..... C. F. White..... R. M. Gordon..... Rev. H. R. McCartney...	
Gorham.....	Mrs. W. P. Paige..... Miss Helen B. Carr..... James T. Culhane..... Henry J. Weston..... Thomas Wight.....	
Goshen.....	John C. Whitney..... Mrs. Stella McCullough...	
Grafton.....	Orra S. Lear..... Mrs. Hattie A. Walker...	Mill Village.
	Walter Clark..... Mrs. Carrie L. Fowler...	Grafton Center. Grafton Center.
Grantham.....	Perley Walker..... Henry W. Hurd..... Mrs. Meora E. Loverin...	
Greenfield.....	Elijah H. Clover..... Mrs. Jennie M. Hopkins...	
Greenland.....	John T. Robertson..... William A. Odell..... Miss Lillian A. Odell....	Bennington.
Greenville.....	Simeon S. Brackett..... Mrs. Bertha C. Ely..... Charles A. Preston..... Mrs. Lena H. Wheeler....	
Groton.....	Fred Kidder..... Josiah Wheel..... W. H. Hunkins.....	North Groton. Cheever.
Hampstead.....	Dr. George R. Bennette.. Woodbury D. Rogers..... Cora B. Wylie.....	West Hampstead. R. F. D. No. 1, Westville.
Hampton.....	Charles M. Batchelder.... Rev. John A. Ross..... Albert L. Joplin.....	
Hampton Falls.....	Frank S. Greene..... Frank B. Fogg..... George C. Smith.....	
Hancock.....	W. M. Davis..... Mrs. Ella A. Robinson.... Arthur P. Brickett.....	Elmwood. Bennington.

TOWN.	NAME.	Post-office address when different from town.
Hanover (Town)...	Bert C. Church..... Arthur E. Rogers..... Mrs. Abbie M. McPherson..	Etna. Lyme. Lebanon.
Hanover (Special)...	Newton A. Frost..... Prof. John V. Hazen..... Mrs. Elizabeth W. Worthen. Horace E. Hurlbutt..... Prof. Charles D. Adams.. Prof. D. C. Wells.....	
Harrisville.....	Samuel D. Bemis..... Charles P. Hayward..... Albert J. Upton.....	Chesham. East Harrisville.
Hart's Location.....	Mrs. C. H. Morey..... Mrs. Florence Monohan.....	Bemis. Mt. Carrigan.
Haverhill.....	Dr. W. E. Lawrence..... Dr. H. W. Leith..... E. M. Clark.....	North Haverhill. Pike.
Haverhill (Woods- ville).....	Mrs. Clara D. Weeks..... H. M. Howe..... T. J. Cree.....	Woodsville. Woodsville. Woodsville.
Hebron.....	Miss Mary A. Rogers..... Mrs. Alma C. Morse..... Miss Alice M. Wells.....	East Hebron.
Henniker.....	George H. Dodge..... Dr. George H. Sanborn.. Mrs. Jennie N. Dodge....	
Hill.....	E. H. Catlin..... A. H. Fowler..... A. A. Bartlett.....	
Hillsborough (Town)	James M. Ray..... Mrs. Mary C. Atwood..... Mrs. Minnie P. Gay.....	Hillsborough Lower Village. Hillsborough Upper Village.
Hillsboro' (Special)...	Leon E. Annis..... George W. Haslet..... Miss Mary A. Crosby.....	
Hinsdale.....	Rev. George R. Locke..... Mrs. Lizzie L. Bailey..... Walter E. Fay.....	
Holderness.....	John H. Perkins..... Harold A. Webster..... Frank E. Barker.....	Plymouth. R. F. D. No. 1, Ashland.
Hollis.....	Franklin Worcester..... Charles E. Hardy..... Clara E. Smith.....	
Hooksett.....	Albert W. Cole..... George Keating..... Samuel Head.....	R. F. D. No. 9, Manchester.
Hopkinton.....	Charles H. Peaslee..... Charles M. Darrach..... J. Arthur Jones.....	Contoocook. Contoocook.
Hudson.....	Henry C. Brown..... Clarence E. Walch..... George W. Clyde.....	Hudson Center. R. F. D. No. 2.
Jackson (Town).....	David G. Dolloff..... George L. Howard..... Wallace I. Haves.....	
Jackson (Special)...	William E. Elkins..... Julia M. Gray..... Mrs. Jennie E. Trickey....	

TOWN.	NAME.	Post-office address when different from town.
Jaffrey.....	Rev. Robert A. Bakeman...	East Jaffrey.
	Edward C. Boynton.....	East Jaffrey.
	Frederick C. Sweeney.....	East Jaffrey.
Jefferson.....	Albert D. Howe.....	Riverton.
	Mrs. Nellie L. Muzzy.....	Meadows.
	William A. Crawford.....	Jefferson Highlands.
Keene.....	Bertram Ellis.....	
	Charles C. Buffum.....	
	Henry W. Lane.....	
	Dr. Gardner C. Hill.....	
	William C. Hall.....	
	Wilton H. Spalter.....	
	Frank H. Whitecomb.....	
	Adolph W. Pressler.....	
	Charles P. Pitcher.....	
Kensington.....	Stephen Brown.....	East Kingston.
	Moses Evans.....	East Kingston.
	George McKenna.....	
Kingston.....	Rev. Frank W. Whipple..	
	Nathaniel W. Garland....	
	Mrs. Flora E. Hilliard....	Exeter.
Laconia.....	W. A. Plummer.....	
	A. C. Moore.....	
	Dennis O'Shea.....	
	Charles K. Sanborn.....	
	LeRoy J. Severance.....	
	Dr. C. S. Abbott.....	
	Dr. A. Haven Harriman..	
	Dr. George H. Saltmarsh..	
	Charles L. Pulsifer.....	Lakeport.
Lancaster (Town)...	J. E. McIntire.....	
	Miss Lillian E. Rosebrook.	
Lancaster (Special) ..	Mrs. Ella J. Hartford....	R. F. D. No. 1.
	Mrs. Elizabeth D. Buckley	
	Fred C. Cleaveland.....	
	George N. Kent.....	
Landaff.....	George D. McKean.....	R. F. D. No. 2, Lisbon.
	Mrs. Lena B. Stimpson...	R. F. D. No. 2, Lisbon.
	Leon E. Noyes.....	R. F. D. No. 2, Lisbon.
Langdon.....	Warren H. Blackmar.....	
	James W. Bascom.....	Alstead.
	Charles Jefts.....	Drewsville.
Lebanon (Town)....	George E. Gile.....	
	Mrs. Lizzie F. Wood.....	West Lebanon.
	F. P. Hatch.....	
Lebanon (High School)	Gilman C. Whipple.....	
	Dr. F. A. Smith.....	
	Rev. C. E. Clough.....	
Lebanon (West)....	Ernest E. French.....	Lock Box A.
	B. Hayden Wood.....	
	Norman C. Powers.....	
Lee.....	Walter D. Smith.....	
	Mrs. Helen B. McRae.....	R. F. D. No. 5, Dover.
Lempster.....	Mrs. L. May Wheeler.....	
	Mrs. Emma T. Welch.....	East Lempster.
	Arthur L. Benway.....	
Lincoln.....	George W. Cowen.....	
	Mrs. Bertha C. Henry.....	
	Miss Mary A. Hanson.....	Johnson.

TOWN.	NAME.	Post-office address when different from town.
Lisbon (Town).....	Edward J. Conrad..... Walter S. Jesseman..... Lorenzo D. Barrett.....	R. F. D. No. 3, Lisbon. R. F. D. No. 3, Littleton.
Lisbon (High School).	Ned G. English..... Alice B. Oliver..... Fred E. Thorpe..... Augustus M. Clough..... Sadie E. Woolson..... Frank Kelsea.....	
Lisbon (Sugar Hill) ..	Mrs. Lizzie M. Bowles.... Mrs. Marcia E. Bowles.... Mrs. Florence L. Blount..	Sugar Hill. Sugar Hill. Sugar Hill.
Litchfield.....	Mrs. Margaret A. Leach.. James Hopwood..... J. Albert Reid.....	R. F. D. No. 1, Hudson. R. F. D. No. 1, Hudson. R. F. D. No. 5, Manchester.
Littleton.....	Andrew W. Bingham..... Miss Julia A. Eaton..... Henry E. Richardson.... Fred A. Dodge..... Frank I. Parker..... Alfred W. Coburn..... Mrs. Lucie E. Bellows.... George Houle..... Mrs. Annette P. Silsby..	
Londonderry.....	Frank E. Robie..... Mabel F. M. Nevins..... Mrs. Nellie F. Gould.....	R. F. D. No. 1, Derry. R. F. D. No. 1, Derry.
Loudon.....	Rev. George O. Wiggins.. Albert E. Colcord..... Dr. W. A. Megrath.....	R. F. D. No. 8, Loudon Station. R. F. D. No. 8, Loudon Station. R. F. D. No. 6, Concord.
Lyman.....	Wilmer Langway..... Miss Candis H. Miner.... James B. Clough.....	R. F. D. No. 3, Lisbon. R. F. D. No. 1, Lisbon. R. F. D., Lisbon.
Lyme.....	Frank A. Chesley..... Thomas E. Dimick..... Elmer F. Morrill.....	Lyme Center. Lyme Center.
Lyndeborough.....	Mrs. S. Kate Swingtonton.. Mrs. Alice M. Chase..... Mrs. Ella R. Holt.....	Wilton. Wilton. South Lyndeborough.
Madbury.....	C. S. Kingman..... A. W. Fernald..... L. H. Young.....	R. F. D., Dover. R. F. D., Dover.
Madison.....	Mrs. Frances Knowles.... James W. Tyler..... John H. Pearson.....	Silver Lake. Silver Lake.
Manchester.....	Eugene E. Reed..... W. Parker Straw..... Edward B. Woodbury.... Harry L. Davis..... Elmer D. Goodwin..... James A. Sayers..... G. M. Davis..... Allan M. Wilson..... Joel S. Daniels..... Frank L. Downs..... Nathaniel L. Colby..... William A. Phinney..... John F. Lee..... Dennis F. O'Neil..... Maurice Watson.....	

TOWN.	NAME.	Post-office address when different from town.
Manchester.— <i>Con- tinued</i> .....	Edson S. Heath..... Walter B. Mitchell..... Frank A. Cadwell..... Timothy Cronin..... Arthur L. Prince..... Francis X. Lyons..... J. H. Rice.....	
Marlborough.....	Levi A. Fuller..... Olive M. Kimball..... Ray H. Page.....	Marlborough Depot.
Marlow.....	Warren M. Davis..... Mrs. Adah M. Ayer..... George F. Geo.....	
Mason.....	Mrs. Annie L. Churchill..... Orren A. Hamblett..... John T. Smith.....	R. F. D., Mason.
Meredith (Town).....	Joseph F. Smith..... Andrew L. Felker..... D. Frank Gilman.....	Meredith Center. Meredith Center.
Meredith (Special).....	Bertram Blaisdell..... E. C. Mansfield..... Edmund Quimby..... Mrs. Minot Hall..... Mrs. Ella E. Eaton..... Dr. F. L. Hawkins.....	
Merrimack.....	George P. Fokett..... Joseph H. Foster..... Mrs. Agnes McIntire.....	Reed's Ferry. Reed's Ferry, R. F. D. No. 2. Reed's Ferry.
Middleton.....	Mrs. Alice M. Shapleigh..... Mrs. Olivette T. Leighton.....	
Milan.....	Mrs. Donnie Wheeler..... Mrs. Virginia Hagar..... A. V. Hibberd.....	West Milan.
Milford.....	Dr. Albert W. Smith..... Mrs. Fanny C. Averill..... Charles A. Langdell.....	
Milton.....	Dr. M. A. H. Hart..... Fred P. Jones..... Joseph Boyd.....	R. F. D., Union. Milton Mills.
Monroe.....	Miss Jeane Moore..... R. S. Ward..... Lizzie McBurney.....	North Monroe. North Monroe.
Mont Vernon.....	Jay M. Gleason..... George C. Hadley..... Nathaniel F. Hooper.....	
Moultonborough.....	James E. French..... Frank S. Lovering..... Rev. W. P. White.....	
Nashua.....	Dr. Charles S. Collins..... Charles E. Faxon..... James H. Tolles..... John H. Vickery..... Arthur K. Woodbury..... Dr. Bradford Allen..... Dr. S. S. Dearborn..... J. J. Doyle..... Harry H. Blunt..... Dr. Charles E. Congdon..... Albert J. McKean..... Daniel W. Perry.....	

TOWN.	NAME.	Post-office address when different from town.
Nelson.....	Helen B. Fletcher..... Clarence S. Fisher..... Mrs. E. M. Tolman.....	Munsonville. R. F. D., Chesham.
New Boston.....	Dr. Herbert D. Gould..... Frank A. Greer..... Charles S. Colburn.....	
Newbury.....	John D. Peaslee..... Mrs. Adah B. Barnard..... Guy D. Nichols.....	South Newbury. R. F. D., Bradford.
Newcastle.....	Frank A. Brown..... Chester A. Becker..... Harry S. Yeaton.....	
New Durham.....	Mrs. Annie M. Canney..... Orin Joy..... Mrs. Sarah E. Coburn.....	R. F. D. R. F. D. R. F. D.
Newfields.....	Daniel R. Smith..... Christopher A. Pollard..... Augustus W. Richards.....	
New Hampton.....	Mrs. Martha Sanborn..... Sam J. Clay..... Leroy Sinclair.....	
New Ipswich.....	Isham E. Aldrich..... Lucy M. Whitnew..... Charles H. Chandler.....	Winona. Box 79. Smithville.
Newington.....	Frederick Pickering..... Charles E. Combs..... Mrs. Rosamond M. Packard.....	R. F. D. No. 1, Portsmouth. R. F. D. No. 1, Portsmouth. R. F. D. No. 1, Portsmouth.
New London.....	C. W. Gay..... C. W. Gordon..... O. D. Crockett.....	Elkins.
Newmarket.....	Frank E. Lang..... Ernest P. Pinkham..... Fred E. Doe.....	
Newport.....	Rotheus E. Bartlett..... George E. Lewis..... George A. Fairbanks.....	R. F. D., Newfields. North Newport.
Newton.....	Harley A. Ranney..... Arletta C. Darbe..... Mrs. Elvira R. Dart.....	
Northfield.....	Charles L. Barnard..... Gawn E. Gorrell..... John B. Yeaton.....	Newton Junction. R. F. D. No. 1. R. F. D. No. 2, Tilton. R. F. D. No. 2, Tilton. R. F. D. No. 2, Franklin.
North Hampton.....	Willard H. Philbrook..... Wilfred J. Chevalier..... Fred Drew.....	
Northumberland.....	J. P. Boucher..... Jay H. Frizzell..... Jacob M. Salomon.....	Groveton. Groveton. Groveton.
Northwood.....	Miss Mary O. Cate..... John A. Tasker..... Edwin F. Towle.....	Box 27, Northwood. Northwood Narrows.
Nottingham.....	William C. Trefren..... Lester E. Williams..... Frank P. Smith.....	West Nottingham. Nottingham Center. South Lee.
Orange.....	Russell Sanborn..... C. H. Ford..... Robert W. Call.....	Canaan. Canaan. Canaan.
Orford.....	Ernest W. Cushman..... Mrs. Clarence H. Carr..... Henry H. Pease.....	Orfordville. R. F. D. No. 1.



TOWN.	NAME.	Post-office address when different from town.
Ossipee.....	Edward J. Scott..... Charles A. White..... Harry P. Smart.....	West Ossipee. Centerville. Center Ossipee.
Pelham.....	Willis E. Pearson..... Mrs. Mary C. Berry..... Miss Susan M. Smith.....	
Pembroke.....	George H. Colby..... Truman Gilson..... George W. Fowler.....	Suncook.
Peterborough.....	Mrs. Annie G. Holt..... Frank S. Davis..... Edwin H. Taylor.....	Box 342.
Piermont.....	H. S. Stanley..... Jennie C. Andross..... A. C. Drury.....	
Pittsburg.....	Willie N. Judd..... H. A. Blanchard..... Oliver M. Johnson.....	R. F. D.
Pittsfield.....	Edward A. Lane..... Miss Agnes Drake..... Sherburne J. Winslow..... Mrs. Martha A. George..... Henry E. Drake..... William P. Adams.....	
Plainfield.....	Daniel C. Westgate..... Miss Lydia S. Penniman..... Mrs. Emma A. Moulton.....	Meriden. East Plainfield.
Plaistow.....	Rev. Albert DeF. Palmer..... Rev. Charles A. Towns..... William H. Freke.....	
Plymouth.....	Mrs. Effie K. Gore..... Charles J. Ayer..... Charles J. Gould.....	
Portsmouth.....	Wallace Hackett..... Calvin Page..... Charles E. Hodgdon..... George W. McCarthy..... Rev. Alfred Gooding..... Rev. George Leighton..... Arthur H. Locke..... Rev. Lucius Thayer..... Alfred F. Howard..... Mrs. Annie H. Hewett..... Mrs. Ida P. Benfield..... Michael E. Long..... Richard I. Walden.....	
Randolph.....	Ralph P. Watson..... Vyron D. Lowe..... Mrs. Florence G. Wood.....	
Raymond.....	Jonathan H. Johnson..... Forrest E. Page..... Harry A. White.....	
Richmond.....	Mrs. Nellie H. Prescott..... Frank S. Bullock..... Mrs. Clara L. Tolman.....	R. F. D. No. 3, Winchester. R. F. D. No. 4, Winchester.
Rindge.....	Mrs. Jane E. Colby..... Herbert D. Thomas..... Ernest W. Ward.....	West Rindge.
Rochester.....	William G. Bradley..... Dr. John H. Bales.....	

TOWN.	NAME.	Post-office address when different from town.
Rochester.— <i>Con- tinued.</i> .....	Irving Corson.....	
	Ernest E. Berry.....	
	Ai S. Annis.....	
	Granville Grant.....	
	Walter Meader.....	
	Albert Nelson.....	
	Rev. C. J. Paradis.....	
	Rudolph Kramer.....	
	John Hanscom.....	
	Charles W. Bickford.....	
Rollinsford.....	A. B. Hunter.....	
	Joseph D. Roberts.....	Dover.
Roxbury.....	Luther W. Brewer.....	Salmon Falls.
	David H. Caron.....	Salmon Falls.
	C. M. C. Phillips.....	East Sullivan.
Rumney.....	George L. Nye.....	Chesham.
	Mrs. Mabel G. Parker.....	Marlborough.
	Mrs. Susie C. Atwood.....	West Rumney.
Rye.....	Elmer B. Wallace.....	Quincy.
	Carrie A. Craig.....	Rumney Depot.
	Dr. Charles F. Patterson.....	
Salem.....	Charles S. Whidden.....	West Rye.
	Chauncey S. Woodman.....	R. F. D. No. 2, Portsmouth.
	William A. Turner.....	R. F. D., Salem Depot.
	Seth M. Pattee.....	North Salem.
Salisbury.....	Charles E. Merrill.....	
	Charles A. Greene.....	R. F. D. No. 1, Andover.
	Helen L. Holmes.....	
Sanbornton.....	Myrtle M. Forsaith.....	R. F. D. No. 1, Andover.
	Rev. E. H. Wright.....	Hill.
	Otis S. Sanborn.....	R. F. D., Laconia.
Sandown.....	George A. Leavitt.....	R. F. D., Laconia.
	Mrs. Jennie M. Lovering.....	R. F. D. No. 3, Chester.
	Horace T. Grover.....	R. F. D. No. 2, Chester.
Sandwich.....	George M. Griffin.....	R. F. D. No. 3, Chester.
	Harriet E. Cartland.....	Whiteface.
	John J. Weed.....	North Sandwich.
Seabrook.....	Dr. A. B. Hoag.....	Center Sandwich.
	Mrs. E. Louise Marston.....	
	George C. Dow.....	South Seabrook.
Sharon.....	John F. Gynan.....	South Seabrook.
	B. H. Sanders.....	Peterborough.
	J. F. Fitzgerald.....	Peterborough.
Shelburne.....	Ellen Wilson.....	Peterborough.
	James Simpson.....	
	Charles M. Philbrook.....	Gorham.
Somersworth.....	James B. Evans.....	
	Dr. T. J. Dougherty.....	
	John B. Morin.....	
	Sidney Stevens.....	
	Peter Gagne.....	
	P. C. Murnane.....	
	John Sullivan.....	
South Hampton.....	Michael Flanagan.....	
	Haven Doe.....	
	Joseph Dehais.....	
	Carrie L. Wyman.....	R.F.D.No.1.Amesbury,Mass.
	Frank O. Towle.....	R.F.D.No.1.Amesbury,Mass.
	Ethel F. Morse.....	R.F.D.No.1.Amesbury,Mass.

TOWN.	NAME.	Post-office address when different from town.
Springfield.....	Charles McDaniel..... Nelson H. Morgan..... Mrs. Ida E. Bailey.....	R. F. D., Enfield. West Springfield. R. F. D. No. 3, Canaan.
Stark.....	C. A. Cole..... J. W. Hickey..... Electa M. Pike.....	Percy.
Stewartstown (Town).....	George H. Carr..... Willie Hall..... B. J. Abbott.....	R. F. D. No. 3, Colebrook. R. F. D. No. 4, Colebrook. R. F. D. No. 3, Colebrook.
Stewartstown (West).....	F. H. Hall..... F. H. Chamberlin..... Elmar Tillesson.....	West Stewartstown. West Stewartstown. Beecher's Falls, Vt.
Stoddard.....	William E. Sharon..... George F. Reed..... Mrs. Ella E. Abbott.....	
Strafford.....	Carroll E. Hall..... Roscoe E. Foss..... Hiram S. Hill.....	Marlow. R. F. D., Rochester. Center Strafford.
Stratford.....	Garvin R. Magoon..... John C. Hutchins..... W. H. Kimball.....	Coos. Coos. Stratford.
Stratham.....	Frank H. Pearson..... Rev. Bernard Copping..... Albert C. Lane.....	
Sullivan.....	Arthur H. Rugg..... Charles Wellman..... Mrs. Mabel H. Reed.....	East Sullivan. East Sullivan.
Sunapee.....	George H. Bartlett..... Rev. H. J. Foote..... Miss Hattie M. Smith.....	
Surry.....	Mrs. Helen J. Wilcox..... Miss Elva E. Mason..... Mason A. Carpenter.....	R. F. D., Keene.
Sutton.....	Robert L. Smiley..... Mary E. Bailey..... Frank C. Thompson.....	North Sutton. South Sutton. North Sutton.
Swanzey.....	Dr. George I. Cutler..... Mrs. Jessie H. Marsh..... George F. Balcom.....	West Swanzey. Westport.
Tamworth.....	E. S. Pollard..... A. S. Fall..... M. E. Robertson.....	
Temple.....	Mrs. Maude Fiske..... Mrs. Maude Davidson..... Mrs. W. E. Hayward.....	Chocorua. R. F. D., Wilton.
Thornton.....	Frank A. Barnard..... Mrs. Isabel F. Hazeltine..... Mrs. Frances Emmons.....	West Thornton. Campton Village. West Thornton.
Tilton (Town).....	W. H. H. Rollins..... Burt C. Abbott..... Mrs. Gertrude B. Ladd.....	East Tilton. R. F. D. No. 1, Tilton.
Tilton (Special).....	O. G. Morrison..... Mrs. Ellen G. Crockett..... Ford H. Sanborn.....	
Troy.....	Rev. Henry S. Kimball..... Mrs. Luetta K. Barnard..... Dr. Harry S. Platts.....	
Tuftenborough.....	Orlando Richardson..... Albert W. Swett..... Asa B. Thompson.....	Melvin Village. Mirror Lake. Melvin Village.
Unity.....	Mrs. Emma L. Stowell..... Mrs. Carrie E. Reed..... Mrs. Spedie A. Newton.....	Quaker City. Newport.

# STATISTICAL TABLES.

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TOWN.	NAME.	Post-office address when different from town.
Wakefield.....	George W. Morrison..... Rev. John A. Chapin..... Luther M. Sanborn.....	Union. Sanbornville.
Walpole.....	C. H. Barnes..... C. J. O'Neil..... James Carroll..... A. W. Brigham..... John H. Taggard..... John W. Graves.....	Bellows Falls, Vt. Bellows Falls, Vt.
Warner.....	Frank W. Johnson..... Edmund C. Cole..... Harlon S. Willis.....	
Warren.....	Charles H. Arnold..... Fred N. Upton..... Scott Gleason.....	
Washington.....	Sumner N. Ball..... Mason H. Dole..... Charles W. J. Fletcher...	East Washington.
Weare.....	Alfred Osborne..... Mrs. Lucie E. Clough...	North Weare. East Weare.
Webster.....	Allen W. Sawyer..... Luther C. Putney..... James L. Colby..... Harry H. Kimball.....	South Weare. R. F. D. No. 16, Penacook. R. F. D. No. 16, Penacook. R. F. D. No. 1, Contoocook.
Wentworth.....	Mrs. Leona C. Foster..... John P. Currier.....	West Rumney.
Wentworth's Location	Mrs. Martha A. Bennett.. Edgar Bennett..... Mrs. Nellia Patterson...	
Westmoreland.....	Eli C. Wellington..... Kirke Wheeler..... Albourne Abbott.....	Spofford.
Whitefield (Town)..	Mrs. J. H. Spaulding.... Mrs. F. W. Swett..... Samuel D. Hunt.....	R. F. D. No. 8. R. F. D. No. 3. R. F. D. No. 1.
Whitefield (Special)..	E. W. Snow..... F. B. Lewis..... Miss Ina B. Parker.....	
Wilmot.....	Mrs. Florence L. Goodhue.. E. H. Howard..... J. K. Stearns.....	Wilmot Flat.
Wilton.....	Stanley H. Abbott..... Mrs. May K. Barrett..... Richard M. Moore.....	
Winchester.....	George W. Pierce..... Francis H. Buffum..... Charles J. Fosgate.....	
Windham.....	J. W. M. Worledge..... Mrs. J. B. Nesmith..... Edward A. Haskell.....	R. F. D. No. 2. R. F. D. No. 1. Windham Depot. Windham Depot. Windham Depot.
Windsor.....	Joseph R. Nelson..... Mrs. Etta G. Nelson..... Walter A. Jacobs.....	Hillsborough Upper Village. Hillsborough Upper Village. Hillsborough Upper Village.
Wolfeboro.....	Willis H. Tucker..... Sewell M. Abbott..... Rev. Allen C. Keith.....	South Wolfeboro.
Woodstock.....	Mrs. Alice P. Emmons..... Mrs. Sadie F. Baston..... Mrs. Effie T. Smith.....	West Thornton. North Woodstock.

# INSTITUTIONS OF A HIGHER GRADE.

## COLLEGES.

TOWN.	NAME.	
Hanover.....	Dartmouth College.....	Rev. William J. Tucker, <i>Pres.</i>
	Medical College.....	Dr. William T. Smith, <i>Dean.</i>
	Thayer School of Engineering.....	Prof. Robert Fletcher.
	Amos Tuck School of Administration and Finance.....	Prof. Harlow S. Person.
Durham.....	N. H. College of Agriculture and the Mechanic Arts.....	William D. Gibbs, <i>Pres.</i>
Manchester.....	St. Anselm's College.....	The Very Rev. Leonard, O. S. B., <i>Director.</i>

## NORMAL SCHOOL.

Plymouth.....	State Normal School.....	James E. Klock, <i>Prin.</i>
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## PRIVATE SCHOOLS.

TOWN.	INSTITUTION.	PRINCIPAL.
Concord.....	St. Paul's School.....	Rev. Dr. Henry Ferguson.
Dover.....	St. Joseph's High School.....	Christian Brothers.
	Sacred Heart High School.....	Sisters of Mercy.
Exeter.....	Phillips Academy.....	Harlan P. Amen.
Lebanon.....	Rockland Military Academy.....	Elmer E. French.
Manchester.....	Mt. St. Mary's Academy.....	Sisters of Mercy.
	St. Augustine's Academy.....	Brothers of the Sacred Heart.
	St. Augustine's Boarding School...	Sisters of Jesus and Mary.
Wolfeboro.....	St. Joseph's High School.....	Christian Brothers.
	Brewster Academy.....	Rev. Charles S. Murkland.

## APPENDIX F.

## LIST OF PERSONS HOLDING PERMANENT STATE TEACHERS' CERTIFICATES.

Teachers are requested to note errors of addresses, etc., and report the same to the Superintendent of Public Instruction.

---

Ruth Amelia Abbe,	Bethlehem
Blanche N. Abbott,	Laconia
Eva Julia Abbott,	Penacook
Gladys F. Abbott,	Tilton
Helen Marie Ackerman,	Bristol
Elizabeth Mae Adams,	Andover
Isabel E. Adams,	Mill Village
Mary Abbie Adams,	Gilsum
Otis Hervey Adams,	Greenland
Hannah Ahern,	Plymouth
Mary Agnes Ahern,	Plymouth
Harriet H. Albee,	Charlestown
Christabel Allen,	Littleton
Edna Adelaide Allison,	Flume House
Rose J. Annis,	Woodsville
Grace B. Applebee,	Ashland
Eda V. Archibald,	Talcottville, Conn.
Bertha A. Arnstein,	Dover
Martha L. Atkinson,	Laconia
Willard B. Atwell,	Coos
Andrew P. Averill,	Edgartown, Mass.
Elva May Avery,	Laconia
Mildred E. Avery,	East Washington
John Bacon,	Milford
Lillian M. Bailey,	Lisbon
Clarence E. Baker,	Derry



Gladys M. Baker,	Ashland
Ina Luetta Balch,	Antrim
Alura N. Barnes,	St. Albans, Vt.
Eva J. Barney,	Grafton
David B. Bartlett,	Manchester
Lillian Bartlett,	Sunapee
Effie Clara Barton,	Newport
Mary E. Batchelder,	Greenville
Edith Frances Beane,	Littleton
Anna Lora Beauchemin,	Laconia
Lois D. Beck,	Greenland
Georgiana Belanger,	Ashland
Frank Howe Benedict,	Sutton, Mass.
Arthur G. Berry,	Plymouth
Ethel L. Berry,	Plymouth
Vera E. Berry,	Meredith
Charles W. Bickford,	Manchester
Angie Bishop,	Colebrook
Helen K. Bittinger,	Haverhill
Susie Blanchard,	Peacham, Vt.
Fannie S. Blood,	Greenville
Laura M. Blood,	New Boston
L. Estella Blood,	Bradford
Helen Newton Bly,	Manchester
Grace M. Bothell,	Lancaster
Florence Elsie Boudette,	White River Junction, Vt.
Bessie P. Boutelle,	Dorchester, Mass.
Jennie Elizabeth Bowden,	Manchester
Lurline Marietta Bowles,	Franconia
Nellie Joanna Boynton,	Concord
Charles Albert Breck,	Methuen, Mass.
Mary A. Brennan,	Manchester
Florence V. Brewer,	Salmon Falls
Annie C. Brierly,	Dover
Ruth L. Brocklebank,	Lebanon

Florence E. Brockway,	Warner
Daisy L. Bronson,	Pattenville
Elizabeth Brooks,	Groveton
Bertram D. Brown,	Hudson, Mass.
Eva A. Brown,	Nashua
Grace M. Brown,	Lakeport
Harry A. Brown,	Colorado Springs, Colo.
Ethel G. Brownsett,	Lakeport
Edith M. Bucklin,	Canaan
Lottie Etta Buffum,	Antrim
Vryling W. Buffum,	Winchester
Eva M. Bugbee,	Wilton
Gertrude Bullard,	Antrim
Georgia A. Bullock,	Tilton
Julia M. Burleigh,	Laconia
Samuel A. Burleigh,	Meredith
Mary Florence Burnham,	Rochester
Theodate Burpee,	Lakeport
Mary Edna Buswell,	Chester
Margaret Butler,	South Columbia
Tryphena M. Butterfield,	Antrim
Martha A. Buzzell,	Lawrence, Mass.
Hattie L. Campbell,	Plymouth
Hattie M. Campbell,	Franklin
Katharine L. Carbee,	Hatley, P. Q.
Maude G. Carleton,	Goffstown
Mabel G. Carley,	Canaan Street
David F. Carpenter,	Orford
Helen B. Carr,	Goffstown
Mabel A. Carruth,	Manchester
Edgar D. Cass,	Manchester
Elizabeth Cate,	Manchester
Grace E. Chandler,	Concord
Alice S. Chase,	Franconia
Edith McAlpine Chase,	Old Orchard, Me.

Edith Myrtle Chase,	East Harpswell, Me.
Marjorie Chase,	Laconia
Rosie Belle Chase,	Derry Village
Eva M. Cheney,	Pembroke
Ina M. Cheney,	Somersworth
Florence A. Chesley,	Freedom
Edith Child,	Woodsville
Sarah L. Clancy,	Nashua
Blanche M. Clark,	Milford
Clarice V. Clark,	North Woodstock
Isa M. Clark,	Danbury
Nina B. Clark,	Sanbornville
Frank H. P. Clement,	Manchester
Ernest Cobb,	Tilton
Ida M. Coburn,	Lisbon
Winifred Cochrane,	Antrim
Dorothy M. Coleman,	Newington
Mary G. Collins,	Plymouth
Nellie Collins,	Rochester
M. Alice Connor,	Newfields
Emily E. Cook,	Rumney Depot
Mary R. Cook,	East Washington
Isaac Copp,	Alton
Blanche L. Corning,	Manchester
Mary Cotter,	Manchester
Grace Critchett,	Barrington
William H. Cummings,	Claremont
Theresa C. Curran,	Somersworth
Clinton Harvey Currier,	Manchester
Clintina E. Curtis,	Plymouth
William H. Cutler,	Lisbon
Anna Ardelle Dalton,	Plymouth
Bertha L. Dame,	Laconia
Elwin Damon,	Lancaster
Mary B. Dane,	New Boston

Valina J. Darling,	Newport
Blanche M. Davis,	Chicopee, Mass.
Carrie Edna Davis,	Plymouth
Emie Oletta Davis,	Saco, Me.
Grace L. Davis,	Berlin
Jeannette S. Davis,	Kingston
Myrtle M. Davis,	St. Johnsbury, Vt.
Walter I. Davis,	Berlin
Ruby W. Davison,	Holderness
Florence M. Dearborn,	Campton Village
Ruth S. Dennett,	Pittsfield
Arthur E. Derby,	Lyme
May F. Dickerson,	Portsmouth
Colema L. Dickey,	Ellensburg, Wash.
Hattie Pearl Dickinson,	Lisbon
Nina M. Doanan,	Greenville
Ellen M. Dodge,	East Holliston, Mass.
Ethel A. Dodge,	Andover
Winifred Dodge,	New Boston
Marion E. Doe,	Rumney
Bessie C. Dolliver,	South Lyndeborough
Katherine E. Donovan,	Bethlehem
Wesley H. Douglass,	Stowe, Vt.
Eva B. Drew,	Colebrook
Carroll H. Drown,	Stowe, Vt.
Fred W. Dudley,	Hollis
Nellie F. Dunnington,	Manchester
Mary A. Durgin,	Newmarket
Jessie M. Dustin,	Plymouth
Luella Eaton,	Wells, Me.
Sarah A. Edgerly,	Chocorua
Sarah M. Edmester,	Boston, Mass.
Corella C. Eggleston,	Berlin
Laura S. Elms,	Lyman
Mary C. Emery,	Auburn

Mildred E. Emery,	Canterbury
Amelia Emons,	Wilmot Flat
Bertha A. Evans,	Exeter
Lillian M. Eveleth,	Gilmanton
Fannie Jane Everett,	Atkinson
Clark T. Falknor,	South Manchester, Conn.
Idella K. Farnum,	Danbury
Florence Fassett,	Lancaster
Mary A. Felsh,	Ashuelot
Warren E. Fisher,	Springfield, Vt.
Effie M. Fitts,	Hanover Center
Austin H. Fittz,	East Jaffrey
Addie L. Flanders,	New Hampton
Daisy Elvira Flanders,	Manchester
Ethel S. Fletcher,	Franklin
Iva M. Fletcher,	Farmington
Katharine O. Fletcher,	Amherst, Mass.
Cora Follansbee,	East Chester
Channing Folsom,	Newmarket
Addie P. Forbes,	Lancaster
Nellie M. Forbes,	Lancaster
Florence M. Forristall,	Alstead
Sophia U. Forsman.	
Alice M. Foss,	Pittsfield
Estella Frances Foss,	Laconia
Ethel May Foss,	Pittsfield
Florence Belle Foss,	Rochester
George E. Foss,	Springfield, Mass.
Ione L. Foss,	Laconia
Mary E. Foss,	Tilton
Marion E. Fowle,	Amherst
Carrie M. Fowler,	South Newbury
Ida M. Fowler,	Short Falls
Elizabeth A. Freeman,	South Royalton, Vt.
Faye Eaton French,	New London

Blanche I. Friend,	Manchester
Vena Annie Frost,	Wolfeboro
Addie B. Gardner,	Franklin
Mabel M. Gardner,	Bradford
Lizabel Gay,	Hillsborough Center
Agnes B. George,	Concord
Millie K. Gile,	Pembroke
Elizabeth M. Gillespie,	Somersworth
Mary Z. Gillingham,	South Newbury
Mabelle F. Gilman,	Plymouth
Susie F. Goddard,	Norwich, Vt.
Eva M. Godfrey,	Northwood Center
Blanche Henrietta Goodwin.	
Emma F. Gordon,	Manchester
Alice M. Gore,	Plymouth
Blanche A. Gould,	Plymouth
Annie L. Gourley,	Dunbarton
Eliza G. Gove,	Plymouth
Margaret Grant,	Vinalhaven, Me.
Grace E. Graves,	Newport
Sara B. Graves,	Newport
Gertrude J. Green,	Chester
Ethel M. Greene,	Chester
Martha Belle Greene,	South Portland, Me.
Jessie F. Grieves,	Somerville, Mass.
Emma F. Griffin,	Gossville
Mabel F. Griffin,	Raymond
H. L. Grinnell, Jr.,	West Derry
Barbara A. Gulliver,	Manchester
Ethel M. Hadley,	South Lyndeborough
Lillian F. Haines,	North Hampton
Agnes E. Hall,	North Monroe
Blanche E. Hall,	Wentworth.
Henry J. Hall,	Elkins
Mabel A. Hall,	Strafford

Edith F. Hannaford,	Peterborough
Sarah E. Hanson,	Dover
Jessie Harmon,	Farmington
Lettie B. Harriman,	Ashland
Thaddeus W. Harris,	Keene
Willard R. Harris,	Orfordville
Annie I. Hart,	Concord
Gertrude M. Hart,	Laconia
Lulu Z. Hart,	Laconia
Bessie M. Hartshorn,	Wilton
Cora Haseltine,	Haverhill, Mass.
Ethyle Hawkins,	Laconia
Franklin E. Heald,	Hanover
Rena S. Hezeltine,	Franklin
Minnie A. Higgins,	Manchester
Norma A. Hill,	Manchester
Florence Hills,	Nashua
Minna Hodge,	Wolfeboro Falls
Sarah A. Hodgman,	Bedford
Nellie A. Holahan,	Laconia
Marion Eliza Hordley,	Laconia
Ethel R. Horne,	Wakefield
M. Gertrude Horne,	Wolfeboro
Vira A. Horner,	Plymouth
Alice Selina Houston,	Plymouth
Alice J. Howard,	Barre, Vt.
Mary E. Howard,	North Walpole
Bessie E. Hoyt,	Concord
Edgar E. Hulse,	Dorchester, Mass.
Clara L. Hunt,	Derry
Isaac Huse, Jr.,	Manchester
Mildred Hutcheson,	Norwich, Vt.
Agnes D. Jaclard,	Laconia
Florence A. Jackman,	Franklin
Margaret B. Jameson,	Antrim



Addie V. Jewell,	West Newbury, Vt.
Alys E. M. Johnson,	Hanover
Florence L. Johnson,	Newbury, Vt.
Frank C. Johnson,	Hillsborough
Gertrude Johnson,	Lisbon
James H. Johnson,	Bradford
Elsie F. Jones.	
Irving W. Jones,	Nashua
Mabel Jordan,	West Lebanon
J. Maude Kenney,	North Weare
Rosie B. King,	Lyme Center
Bessie B. Kinne,	Littleton
Sarah L. Kinney,	Claremont
G. G. Klock,	Plymouth
Ida M. Klock,	Plymouth
M. Lena Klock,	Plymouth
Alonzo J. Knowlton,	Presque Isle, Me.
Myra Knowlton,	Riverdale
Bertha Lamprey,	Wolfeboro
Izora G. Lamprey,	Wolfeboro
Maude A. Lamprey,	Manchester
S. Blanche Lamprey,	Portsmouth
Myra F. Lane,	Gilmanton
Ruth E. Lane,	Gilmanton
Mabelle M. Lang,	Lakeport
Julia F. Langdell,	New Boston
Nellie S. Laughlin,	St. Johnsbury
Ellen M. Lawlor,	Lowell, Mass.
Grace E. Lawrence,	Meredith
Nettie E. Leach,	Exeter
Bernice A. Leavitt,	Laconia
Florence M. Leavitt,	Lakeport
Bessie F. Leckie,	Manchester
Elsie Louise Leighton,	Dover
Fred S. Libbey,	Berlin

Minnie Moore Libby,	Laconia
Phebe E. Libby,	Whitefield
Lena M. Liscom,	Hinsdale
Mildred Leola Lomas,	Colebrook
Grace E. Lord,	Ashland
Mary E. Lord,	Boston, Mass.
Edith C. Loring,	Milford
Everett G. Loring,	Kingston, Mass.
Ada E. Loughead,	Franklin Falls
Annie B. Lyon,	Pelham
Susan E. McAllester,	Newbury Center, Vt.
S. H. McCollester,	Marlborough
Mary McDonough,	Dover
James A. MacDougall,	Contoocook
Harriet C. McDuff,	Tilton
Ruby E. McIntire,	Concord
Elizabeth A. McLaughlin,	Laconia
Jennie R. McLaughlin,	Manchester
Katherine M. McLaughlin,	Laconia
Ella Lillian Major,	Lancaster
Laura Helen Manderson,	Gorham
Bertha L. Marden,	New Boston
Grace E. Marden,	Short Falls
Mabel Marden,	Suncook
Belle H. Marsh,	Newmarket
Clarence H. Martin,	Havehill
Ethel Avis Martin,	East Grafton
Oriola E. Martin,	Manchester
Robert W. Martin,	Sabattus, Me.
Maude M. Martineau,	Littleton
Lutie E. Mason,	Laconia
Alta B. Maxwell,	Dover
Abbie G. May,	Barton, Vt.
Evelyn B. Meader,	Dover
Adelaide Merrill,	Hampton

Florence E. Merrill,	Plymouth
Leon O. Merrill.	
Mary E. Merrill,	North Haverhill
Nettie P. Merrill,	Warren
Etta M. Miller,	Antrim
Mary A. Miller,	Francestown
Mary A. Minehan,	Somersworth
Ida L. Montgomery,	Manchester
Benjamin S. Mooney,	Rochester
Harry L. Moore,	Wolfeboro
Josephine Moore,	Lakeport
May W. Moore,	Wilton
M. Elsie Moore,	Goffstown
Mary V. Moore,	Lisbon
Marita L. Morgan,	Hillsborough
Alfred B. Morrill.	
Annie L. Morrison,	Portsmouth
Fanny L. Morrison,	Dover
Florence A. Morrison,	Dover
Grace E. Morse,	Plymouth
Marian I. Morse,	West Derry
Helen F. Moulton,	Dover
Mary L. Mudgett,	Lisbon
Charlotte S. Murphy,	Manchester
Edith Murphy,	Manchester
Katherine A. Murphy,	Dover
Florence A. Murray,	Berlin Mills
Ethel L. Muzzey,	Antrim
Violet B. Naas,	Lisbon
Winifred S. Nichols,	Ashland
Marguerite Noonan,	Gorham
Henrietta Norton,	West Derry
Nellie Traverse Nute,	Milton
Mary T. O'Connor,	Concord
Ethel M. Odell,	Bennington

Mary H. O'Dowd,	Manchester
William R. O'Neil.	
Annie I. Ordway,	Penacook
Charles Osborne,	North Weare
Margaret C. O'Shea,	Laconia
Annah Osgood,	Franklin Falls
Mae Eloise Osgood,	Epping
Henrietta Otterson,	Hooksett
Dora E. Page,	Pittsfield
Emma S. Page,	Gilmanton
Josephine Page,	Sanbornville
Norman J. Page,	Lisbon
Alice M. Paige,	Concord
Ethel M. Paige,	Stoneham, Mass.
Zetta M. Paige,	Goffstown
Donna M. Palkey,	Plymouth
Esther E. Palmer,	West Derry
Ida F. Pattee,	Bristol
Lena Patten,	Bristol
Wilhelmina Patterson,	Salem, Mass.
Ina J. Pearson,	Laconia
Etta C. Pease,	Penacook
Gertrude M. Perry,	Portsmouth
Myra Frances Perry,	Antrim
Helen A. Phelan,	Portsmouth
Helen B. Phillips,	Franklin
Mary Louise Phillips,	Concord
L. Grace Pillsbury,	Plymouth
Blanche M. Plaisted,	Plymouth
Eliza R. Pratt,	West Hartford, Vt.
Henry H. Pratt,	Hinsdale
Lela M. Pray,	Bristol
M. Carlena Prescott,	Manchester
Mary Putnam,	Wilton
Alice T. Quinn,	Plymouth

Ethel M. Ramsden,	Concord
Alice S. Rand,	Canaan
Gertrude Randall,	Penacook
Helen D. Randall,	Pittsfield
Louis DeWitt Record,	Walpole
Mary A. Redmond,	Lancaster
Agnes Regan,	Portsmouth
Lulu M. Reed,	Plymouth
Edith L. Reiley,	Laconia
Crissia B. Renfrew,	Peacham, Vt.
Florence Reynolds,	South Bolton, Que.
Fordyce T. Reynolds,	Woodsville
Clinton J. Richards,	Bar Harbor, Me.
J. Sherman Richardson,	Brookline, Mass.
Mabel A. Richardson,	Los Angeles, Cal.
Emma Roberts,	Laconia
Eva A. Roberts,	Plymouth
Henry S. Roberts,	Wolfeboro
M. Louisa Roberts,	Greenland
Nora C. Roberts,	Seekonk, Mass.
Thomas A. Roberts,	Lebanon
Blanche G. Rogers,	Plymouth
Mabel DeV. Rogers,	Chester
Annie I. Rollins,	Rochester
Bessie A. Rollins,	Grafton
Charles J. Ross,	Hampton
Maud Rowe,	Franklin
Anna L. Rowell,	Newton
Una R. Rowell,	New London
Alma Blanche Roy,	Somersworth
Susan C. Russell,	Plymouth
Channing T. Sanborn,	Union
Henry C. Sanborn,	Danvers, Mass.
Myrtie B. Sanborn,	Laconia
Emma L. Sanders,	Laconia

Gertrude Sanders,	Laconia
Harriet M. Sanders,	Claremont
Alice Sargent,	Plymouth
Grace O. Sargent,	Plymouth
Edith Blanche Sarson,	Bartlett
Carlena A. Savory,	Manchester
Gertrude E. Sawyer,	North Weare
Annie A. Schlenker,	Rochester
Abbie Scruton,	Rochester
Alta B. Scruton,	Gonic
Helen L. Seavey,	Greenland
Ella C. Shannon,	Laconia
Minnie B. Shattuck,	Laconia
Ella M. Shaw,	Andover
Martha M. Shepard,	Ashland
Ernest L. Silver,	Portsmouth
Frances Simpson,	Bradford
Margaret I. Simpson,	Berlin
Robert J. Sisk,	Dover
Donna M. Slater,	Rumney Depot
William H. Slayton,	Franklin
Alberto W. Small,	Braintree, Mass.
Alice E. Small,	Northwood Narrows
Maude E. Smart,	Colebrook
Melville C. Smart,	Littleton
Bertha G. Smith,	West Derry
Luella F. Smith,	Claremont
Mary L. Smith,	South Acworth
Mattie M. Smith,	Lakeport
Mehitable J. Smith,	Raymond
Willis O. Smith,	Lancaster
Mary Southwick,	Marlborough
Alice C. Spaulding,	Somersworth
Fred L. V. Spaulding,	Manchester
Sarah E. Spaulding,	Rumney

Alice I. Spencer,	Lawrence, Kan.
Kathrina E. Spencer,	Hanover Center
Nancy C. Spencer,	Newmarket
Zella Gertrude Spencer,	Rochester
Ida M. Spooner,	Franconia
Wilbur B. Sprague,	Winchendon, Mass.
Maud Starling,	Plymouth
Bernice M. Stearns,	Dover
Henry B. Stearns,	Manchester
Blanche Stedman,	Plymouth
Henrietta Steinfeld,	Berlin
Carolyn T. Stevens,	Salmon Falls
Dorothy G. Stevens,	Franklin
Ethel M. Stevens,	Franklin
Mary E. Stevens,	Clinton Grove
Annie E. Stickney,	Campton
Blanche L. Stirling,	Dover
Hattie Stone,	Plymouth
Phoebe E. Stone,	Plymouth
Henry C. Stoughton,	Newport
Lena A. Stover,	Kittery, Me.
Bertice Z. Streeter,	Claremont
Elfa H. Streeter,	Hinsdale
Annuia Florina Sullivan,	Somersworth
George W. Sumner,	Penacook
Frank S. Sutcliffe,	Newport
Mabel M. Sutton,	Laconia
Edith L. Swain,	Lakeport
Augusta M. Tappan,	West Lebanon
Aaria M. Taylor,	Concord
Cora Wood Taylor,	Dalton
J. Maude Taylor,	Center Effingham
Mary Emma Taylor,	Alexandria
Lena M. Tewksbury,	Colebrook
Lillian T. Thomas,	Plymouth



Agnes Thompson,	Lancaster
Isabel Thyng,	Woodsville
Minnie B. Timson,	Hyde Park, Mass.
Mae B. Tirrell,	West Manchester
Bertha M. Tisdale,	Manchester
Rachel E. Toas,	Dover
Ethel A. Tobey,	Pike's Station
Oliver H. Toothaker,	Berlin
Charles A. Tracy,	Meriden
Emily N. Tracy,	Windsor, Vt.
Martha H. Tracy,	Lancaster
Laura A. True,	Hillsborough
Evelyn Tucker,	Lakeport
Fanny J. Tucker,	Colebrook
Clara B. Tuttle,	Newbury Center, Vt.
Ethelyn A. Tuttle,	North Nottingham
Eugene Tuttle,	Campton
Ina Ethel Tuttle,	Manchester
Clara E. Upton,	Nashua
Ross Varden,	Westwood, Mass.
Lida Varney,	Gonic
Annie M. Vose,	Manchester
Shirley M. Wallace,	Livermore Falls
Maud H. Wallis,	Sanbornton
Dessa M. Washburn,	Plymouth
Ruth Waterhouse,	Barrington
Thomas W. Watkins,	Coos
Martha B. Watson,	Ashland
Arthur R. Webster,	Medford, Mass.
Ruth E. Weeks.	
Sadie Wells,	Danbury
Nellie M. Wentworth,	Milton
Eva M. Whalen,	Bethlehem
George H. Whitecher,	Berlin
Jennie N. Whiteher,	Easton

Everett T. Whitford,	Pittsfield
Bertha Whitney,	Franconia
Louis L. Whitney,	Kendall Green, Mass.
Edith Whittemore,	Pembroke
Edwin J. Whittemore,	Rochester
Sarah Morse Whitton,	Wolfeboro
Maude Wiggin,	Dover
Frank B. Wright.	
Mary Ann Wight,	Gilmanton
J. E. Wignot,	Salem
Harriette B. Wilder,	Lancaster
Henrietta G. Wilder,	Lancaster
H. F. Wiley,	Laconia
Bessie N. Willey,	Sanbornville
Harriet Williamson,	Manchester
Jennie Williamson,	Manchester
Eulelah H. Wilson,	Lisbon
George Winch,	Manchester
Clara W. Winslow,	Portsmouth
Ernest C. Witham,	South Boston, Mass.
Mary E. Woodbury,	Francestown
William B. Woodbury,	Farmington
Hervey L. Woodward,	Bath
Lura C. Worthen,	Melvin Mills
Bertha M. Wright,	Rumney Depot
Annabel D. Wyman,	Manchester
Nellie L. Wyman,	Meriden
Addie Estelle Young,	Franconia
Edith Belle Young,	Franconia

## APPENDIX G.

### DECLARATION OF PRINCIPLES OF THE NEW HAMPSHIRE STATE TEACHERS' ASSOCIATION ADOPTED AT THE FIFTY-FOURTH ANNUAL MEETING, 1907.

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From year to year, this Association has lent its influence to whatever stands for the betterment of educational conditions in the state. It is therefore fitting that it again give public expression of its stand on these same subjects at this, its fifty-fourth annual meeting.

A retrospect of the work of the last few years, gives us ample cause for rejoicing over what has been actually accomplished. We gratefully acknowledge these accomplishments, and rejoice in the educational awakening so evident from Coos to the sea, in every line of educational endeavor. We extend our thanks to the legislative and executive officials who have made such an awakening possible; and we look forward hopefully to the future.

But while grateful for the past and hopeful for the future, we realize that the needs are growing with the years, and that unceasing effort is required to meet them.

The proper education of its youth is the highest obligation that rests upon the state. This obligation can be met properly, only when the teaching force is of the best that can be had, and the best is none too good. Anyone can "keep school," but only the trained educator can properly *teach*. The supply of trained teachers is not equal to the demand. The demand can be satisfied only by increasing the supply. We therefore reaffirm our belief in the need of

more normal schools in this state, and urgently ask the next legislature to provide for their establishment, reminding them that an intelligent yeomanry is the best guarantee of peace, and that any sum of money spent for normal schools will do far more for the permanent uplift of the state than will the same amount spent on armories, which, in the main, benefit chiefly the cities for which they are purchased.

We recognize as one of the worst hindrances to efficient work in our school system, the constant, almost yearly, shifting of teachers. No school can accomplish what should justly be required of it, unless its teaching force is sufficiently permanent to put into effect a course once undertaken; and we note with regret that practically one third of the high school teaching force and a much larger proportion of the common school force of this state changes each year.

We believe that this deplorable condition may be improved;—first, on the part of the teachers, by a better regard for the “Law of Contracts,” by a realization of the truism that salaries are not always the highest indication of success, and that one is under moral obligations to a community in which he serves as teacher; second, on the part of school officials, by an honest effort to realize that “the laborer is worthy of his hire,” and that teachers are entitled to wages commensurate with the position which they are assumed to occupy in the community; third, on the part of superintendents by a keener regard for the rights of others; and fourth, on the part of all, by efforts looking to the establishment of a state pension system which shall aid in the support of such teachers as have devoted years of service for the educational well-being of single communities and to the enactment of laws for the protection of teachers from every species of pull and petty dissatisfaction, during competency and good behavior.

When, in 1897, this association first publicly advocated the present high school law, it did so hopeful of its possibilities.

The results of the passage of that law have surpassed expectation.

The notable increase of pupils to whom it has brought a high school education and the tremendous uplift it has given the cause of secondary education throughout the state are most gratifying. Its latest results, that of adding mechanic arts and agricultural courses to high school curricula, meet our warmest approval. The importance of education in the common things of life has been too often overlooked. The farmers' children have too often been educated to hate the farm, and our rural communities have thus been drained of their best blood to give new life to the sluggish arteries of cities and towns, forgetting that character, not calling, is the measure of a man.

The artisans' and mechanics' sons have been led to look with disfavor upon their father's callings, and the supply of capable men for such pursuits has fallen below the demand.

We therefore hope that the state will by every means at its command, extend such courses as shall train those not intended for professional lives, along the lines which shall best serve their future needs, remembering that the education of heart, mind and hand should keep in closest contact.

No system of education can be highly efficient in which there is lacking a central power for determining the qualifications of those engaged in carrying it on. New Hampshire's present system of certification of teachers through boards of education whose members are seldom qualified to pass judgment on the requirements of modern teachers, is antiquated and inefficient in the extreme. We therefore again, in behalf of all that is best in education, urge that authority for the registration of teachers be placed under

the direction of the Department of Public Instruction, where it properly belongs.

We note with satisfaction the millions of dollars yearly bestowed upon our colleges and other private institutions of learning.

We believe, however, that it is too often wealth given for the education of the classes rather than the masses, and that the donors forget that it is not the colleges, but the common schools which are the bulwarks of national power.

We therefore ask the wealthy men of our state to consider whether their money may not be more justly bestowed upon the schools now wholly supported by taxation—bestowed, not as endowments, but as comparatively small, outright gifts for special equipments which shall add much to the practical working efficiency, especially of our high schools.

We note with pleasure the good results of the system of equalization in school taxes, by which the wealthier communities are made to assist their less fortunate fellow-citizens in the rural parts of the state.

We recognize in this system one of the surest means for the prosperity and educational uplift of such communities and thus the whole state. We therefore urge the extension of the Equalization Fund until the school tax shall be as nearly uniform as is practicable throughout the state.

The value of expert supervision of schools is being realized, and the fact that over sixty per cent. of the school population of the state are now under trained supervisors is a most hopeful outlook.

We believe that the time will soon be ripe for placing every school in the state under competent supervisors, and we urge upon the coming general court the thoughtful consideration of making expert supervision obligatory throughout the state, as in our sister commonwealth of Massachusetts.



We note with satisfaction the splendid achievements of the educational council, established under authority of this association, and we pledge it our moral and financial support.

We recognize the need of sympathy and co-operation among all the educational interests of the state. While grateful for the growing sympathy between the private and public schools and our colleges, we urge that every effort be made for still closer union of all these interests.

We wish to express our high appreciation of the efficient work that is being done for the cause of education: by the Normal School, which, under Principal Klock, has awakened such a lively interest in primary methods throughout the state; by the state college, which, under President Gibbs, is rising so rapidly to a position of power in the state; by Dartmouth College, under the faithful and inspiring leadership of President Tucker; and especially by the Department of Public Instruction, which has done so much to force upon school authorities in town and country a realization of their duties and obligations, is unifying the aims and methods of the rural schools, and has given an especial uplift to secondary schools by means of the power given through the high school law.

We pledge to Superintendent Morrison our hearty support and co-operation.



DECLARATION OF PRINCIPLES OF THE NEW  
HAMPSHIRE STATE TEACHERS' ASSOCIATION  
ADOPTED AT THE FIFTY-FIFTH ANNUAL  
MEETING, 1908.

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This Association, not only by its influence as members and individuals, but also by resolutions adopted at its annual meetings, has brought the attention of our citizens to needed legislation for promoting the efficiency of the schools throughout the state.

Several wise laws have been enacted as a result of that effort. Now is not the time to halt. Every year sees our registered attendance larger, bringing additional numbers in touch with the most inspiring and the most advanced educational thought of the state.

While we may look backward and see laws and opinions worthy of congratulation, we should treat them only as starting places for fresh thought, new endeavors, and more determined efforts to keep on with the work to meet the new conditions of a more complex life. There are many signs of betterment.

The principle that the child is a citizen of the state before he is a citizen of his own town has received the sanction of the law-making body of the state. Such a law, aided by a generous support from the state, has already begun to show its beneficent effects in a more truly democratic education and the provision of more nearly equal opportunities for every child in the state.

We, therefore, again affirm our belief in the equalization law of 1899, and recommend its extension.

While we congratulate ourselves upon the large number who have received state certification, we earnestly recommend to all members of this Association the advantage of obtaining this certificate for themselves. Every teacher

who obtains this certificate helps to lift all to a higher plane of recognized scholarship. We, therefore, recommend the attention of all teachers to the desirability of giving their aid to a uniform state certification of teachers.

We recommend that the legislature establish general qualifications for teaching in the public schools to the ultimate end, that none but those holding state certificates or their equivalent be employed.

We recommend, in conformity with a state system of schools, that more power be centralized in the state department for the better inspection of schools, believing that the general efficiency of the schools will thus be increased.

Again we call attention to the lack of sufficient normal schools to supply our own needs. Our one normal school is wholly insufficient. Its standing is of such excellence that only the richer communities can obtain the services of its trained teachers. It is doing a noble work, but more schools of the same kind and standard are needed to afford a supply of teachers, mentally equipped and properly trained.

The increased number of pupils in our high schools and academies since the passage of the high school law in 1901 is hard to realize. This increased number, fully one thousand more than seven years ago, is accounted for not only by the free preparation for college thus afforded, but also by the introduction of those studies and courses which this Association has recommended, the mechanic arts and agricultural courses.

We again repeat the value to be obtained to any community by granting permanency of positions to those teachers whose value has been determined.

We note with pride the gradual extension of expert supervision, until over sixty per cent. is now under such care.

We recommend to the teachers and officials of the ninety odd towns which have never voted for supervision, to make a non-partisan comparison of the schools in those various towns with those schools which have been under supervision.

We recommend to them these points for consideration. Which class of schools has the better organization, the longer terms, better paid teachers and consequently more efficient ones? Which class of schools gives to its pupils a working command of a considerable body of knowledge with an awakened and trained intellectual life?

We recommend to the legislators of our state such a modification of the present supervisory law as will render it more stable in order that the highest class of superintendents may be employed.

As the education of the child should be continuous whether in public or private schools, elementary, secondary, or college, any steps which will tend to further cement a community of interest is cause for congratulation.

The New Hampshire State Teachers' Association extends a hearty vote of thanks to all state and city officials, to all organizations and bodies, to individuals and citizens who have contributed to make this, the fifty-fifth annual meeting of this Association a success.

A vote, hearty, unanimous and far reaching enough to include not only the workers of the present but also those of the past, whose sturdy belief in the principles of the Association has made it possible by legislative enactment for such a large number to attend.

# APPENDIX H.

## DECISION OF SUPREME COURT

IN

*New Hampton Institution v. Northwood School District & a.*

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Pupils who have received instruction under a contract between their parents and an institution of learning are not liable for tuition fees, if they neither requested such instruction nor promised to pay therefor.

An institution of learning which furnishes instruction under an agreement to look to a school district for compensation cannot maintain assumpsit against the pupil's parent for the tuition fees. Under chapter 96, Laws 1901, a school district which does not maintain a high school is only liable for the tuition of children who have not received instruction in a high school or one of corresponding grade, and for such time as is required for the completion of one full course.

ASSUMPSIT. Five actions, in which the plaintiff, an approved school within the meaning of section 4, chapter 96, Laws 1901, seeks to recover in each suit the tuition of one child for the school year of 1903-1904. The defendants in each case are the school district in which the pupil lived with his father, the father, and the child. All the children had taken a four-years' course at an approved school before their parents sent them to New Hampton Institution, one having graduated in 1901, two in 1902, and two in 1903. The school district paid nothing for the pupil who graduated in 1901, but paid a year's tuition for those who

graduated in 1902, and two years' tuition for those who graduated in 1903.

At the April term, 1907, of the superior court, the question of the liability of the defendants, or any of them, was transferred at the request of the parties, without a ruling, by *Pike, J.*

*Felker & Gunnison*, for the plaintiffs.

*Burnham, Brown, Jones & Warren*, for Northwood school district.

*Eastman, Scammon & Gardner*, for the other defendants.

*Young, J.* As the facts are understood, the instruction for which the New Hampton Institution seeks to recover was furnished to the children under a contract between the Institution and the children's parents. If that is the fact, the Institution can recover from the parents, but not from the children; for it is not found that the children either requested the Institution to instruct them, or promised to pay for the instruction furnished. If, however, the instruction was not furnished by virtue of any contract, express or implied, between the Institution and the parents,—that is, if it was understood and agreed between them that the Institution should look to Northwood school district for compensation,—it cannot maintain these actions against the parents. *Concord Coal Company v. Ferrin*, 71 N. H. 33.

But however that may be, neither the Institution nor the children's parents can maintain an action against the defendant district by virtue of any provisions of the common law; and neither the Institution nor the parents can recover from the district unless section 2, chapter 96, Laws 1901, gives a right of action to one or both of them. That section is as follows: "If any town in which a high school or school of corresponding grade is not maintained



neglects or refuses to pay for tuition as provided in the preceding section, such town shall be liable therefor to the parent or guardian of the child furnished with such tuition if the parent or guardian has paid the same, or to the town or city furnishing the same, in an action of contract." The section gives parents, and school districts which maintain approved schools, an action against school districts which neglect or refuse to pay tuition for which they are made liable by section 1 of the act, but it does not give one to academies or approved schools as such. *Sanborn Seminary v. Newton*, 73 N. H. 109. Consequently the New Hampton Institution cannot maintain an action against the defendant district; but since it can maintain an action against the parents, and they can recover of the district if they pay the Institution, the district's liability for the tuition has been considered.

The children had all graduated from an approved school before their parents sent them to the New Hampton Institution. The question of the district's liability therefore depends on whether the legislature intended, by the enactment of chapter 96, Laws 1901, to compel school districts in which approved schools are not maintained to pay tuition of children residing therein as long as they choose to attend an approved school elsewhere, or whether the liability imposed is limited to the payment of the tuition of children who have not graduated from such a school, for such time as is necessary to enable them to take one full course. In considering this question it is immaterial when the children graduated, or who paid their tuition. The material question is whether they are such children as the legislature intended to benefit. The question therefore is: Did the legislature intend to impose an unlimited liability on such districts for the tuition of children residing therein, or did it intend to limit liability to the payment of the tuition of children who have not graduated from an approved school? It is clear that the duty was imposed

on such districts because of their failure to furnish such instruction as it was thought should be available to every child in the state; in other words, one purpose of the act is to standardize the instruction which districts must provide for the benefit of the children residing therein. Since that is the purpose of the act, it is improbable that the legislature intended to compel districts failing to maintain approved schools to provide more instruction than is demanded of districts in which such schools are maintained. In the absence of evidence as to the fact, it cannot be assumed that the legislature intended to make such districts liable for the tuition of all the children living in them, for all the time they choose to attend an approved school, unless districts which maintain schools approved for only one course are liable for the tuition of children who have taken that course, while they take another course at another approved school. It is not likely that the legislature would compel a district too poor to maintain an approved school to do more for the education of its children than is required of a district which is able to maintain such a school. It is certain that a district which maintains a school with only one course of instruction cannot be compelled to pay the tuition of children who, having taken that course, attend an approved school elsewhere. Public Statutes, c. 89, ss. 9-13; Laws 1899, c. 77; Laws 1901, c. 96; Laws 1903, c. 118; Laws 1905, c. 19; *Ib.*, c. 90.

If, therefore, the legislature did not intend to impose upon districts which fail to maintain approved schools a greater duty in respect to furnishing instruction than that imposed on districts which do maintain them, the question in this case is not whether a district which maintains a school with more than one approved course can be compelled to permit children residing therein to take more than one course at that school, but is whether a district which maintains a school approved for only one course can



be compelled to pay the tuition of children who, having taken that course, attend an approved school elsewhere.

Whatever duty is imposed on districts which fail to maintain approved schools is created by chapter 96, Laws 1901, as amended by chapter 118, Laws 1903. If such districts can be compelled to furnish instruction which districts maintaining approved schools are not required to provide, it is by virtue of these enactments. Section 1 of the act provides that "any town not maintaining a high school or school of corresponding grade shall pay for the tuition of any child who with parents or guardian resides in said town, and who attends a high school or academy in the same or another town or city in this state, and the parent or guardian of such child shall notify the school board of the district in which he resides of the high school or academy which he has determined to attend." Section 4 provides that "by the term 'high school' or 'academy,' as used in this act, is understood a school having at least one four-years' course, properly equipped and teaching such subjects as are required for admission to college, technical school, and normal school, such high school or academy to be approved by the state superintendent of public instruction as complying with the requirements of this section, and said superintendent is authorized to approve a school maintaining any part of such course for the part so maintained." If the language of section 1, considered by itself, is capable of a construction which imposes an unlimited liability upon districts failing to maintain approved schools in respect to the payment of the tuition of children who attend such schools elsewhere, it is clear, when the section is read in connection with section 4, that such was not the sense in which the legislature used it. Section 4 defines the duty imposed by section 1; and if the language of section 4 is given its ordinary meaning, the duty imposed by section 1 is limited to paying the tuition of children while they are obtaining a high school education.

Districts which maintain schools approved for a part of a high school course—say for two years—are only liable for tuition of children for the remaining two years of the course. The fact that districts which maintain schools so approved are only liable for tuition while the children complete the course is conclusive that the legislature intended to limit the duty imposed by the act to the payment of the tuition necessary to enable the children to graduate from an approved school. Since this is so, the act is not intended to benefit children who have graduated from such a school; and consequently it must be held that the Northwood school district is not liable for the tuition of these children, either to the New Hampton Institution, or to the children's parents.

*Case discharged.*

All concurred.

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## DECISION OF SUPREME COURT

IN

*Lawrence v. Toothaker & a.*

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ASSUMPSIT for services rendered in making plans for a schoolhouse in Berlin. Trial by jury and verdict for the plaintiff. Transferred from the December, 1907, term of the superior court by *Chamberlin, J.* The evidence tended to show the following facts: The plaintiff is an architect and the defendants constituted the board of education of Berlin at the time of the contract in question. The defendants requested the plaintiff to make plans for a school building to take the place of one that had been burned and after some negotiations between the parties a contract was agreed upon for the employment of the plaintiff. Soon

after, the defendants notified the plaintiff to cease working on the plans, as they did not wish to use his plans. He replied that he should hold them to the contract. He charged his services to the city of Berlin and understood that he was dealing with the board of education. In a suit against the city on this account he was unsuccessful upon the ground that the board of education had no authority to bind the city. Both parties acted in good faith in making the contract. The defendants' motion for a verdict was denied subject to their exception.

*Scott Sloan*, for the plaintiff.

*Matthew J. Ryan* and *Edmund Sullivan*, for the defendants.

*Walker, J.* The evidence is not sufficient to support a finding that at the time the contract was made the defendants intended to bind themselves personally, or that the plaintiff understood they did. No express promise on the part of the defendants was made and it was not suggested by the plaintiff, that the defendants were to be deemed the responsible contracting parties. Nor is there any evidence that the defendants suppressed any material facts relating to their authorization to bind the city. Both parties acted in good faith upon the assumption that the defendants were authorized to make the contract as representatives of the city; and in accordance with that understanding the plaintiff gave credit to the city. It may be conceded that the defendants as the board of education had no authority to contract with the plaintiff for and in behalf of the city and that the attempted exercise of such authority was futile. But it does not follow that the defendants bound themselves to pay for the plaintiff's services. *Ogden v. Raymond*, 22 Conn. 379, 384. The board's want of statutory power to do what it attempted to do was as much within the cognizance of the plaintiff

as that of the defendants. *Richards v. Columbia*, 55 N. H. 96, 99; *Sprague v. Cornish*, 59 N. H. 161. The plaintiff was chargeable with knowledge of their official limitations; and having voluntarily contracted with them in their official capacity and given credit to the city for the performance of the contract, he is in no position to claim that the defendants are personally responsible on the contract, in the absence of an express promise by them to incur that responsibility, unless the law would imply a promise of guaranty that they had the requisite power. But "where all the facts and circumstances surrounding the case are known to both the agent and third party, but there is a mutual mistake as to a matter of law—as the principal's liability or the legal effect of the agent's written authority—the agent cannot be held personally responsible by reason of the mere fact that the principal cannot be held, unless the agent by some apt expression guarantees the contract or assumes it himself." 2 Clark & Skyles, Agency, S. 582 b; *Jefts v. York*, 10 Cush. 392. And this principle of law is equally applicable when public officers, like the defendants, assume to bind the public by their contracts with third parties. Their authority is statutory, and whether their attempted exercise of it in a particular case is authorized is ordinarily a question of law, which the other contracting party has ample opportunity to investigate and decide for himself. If for any reason he is unwilling to incur that risk, an express guaranty by the other that he acts within the scope of his authority would be necessary to render the latter liable on the contract. *Underhill v. Gibson*, 2 N. H. 352; *Brown v. Rundlett*, 15 N. H. 360; *Farnum v. Davis*, 32 N. H. 302. Cases like *Weare v. Gove*, 44 N. H. 196, do not conflict with this result. It was there expressly recognized (p. 197), that the agent cannot be held, "where the promisee, being fully informed of the facts upon which the assumed

authority rests, forms his own judgment, and contracts for and relies upon the engagement of the principal alone. In such a case it would be unjust that the agent should be bound, because such was not the contract."

As the reported evidence negatives the idea that the parties intended that the defendants should be individually liable on the contract, and as there is no evidence that they guaranteed their authority, or were guilty of any fraud upon the plaintiff, the defendants' motion for a verdict should have been granted.

*Exception sustained; verdict set aside.*

All concurred.

# APPENDIX I.

## VOTE OF DISTRICT SCHOOL MEETING, 1908.

TOWNS.	Vote for president 1908.	Vote for governor 1908.	Total vote at school meeting 1908.	Men.	Women.
Alexandria.....	170	168	60	46	14
Allenstown.....	214	207	13	8	5
Alstead.....	222	211	70	52	18
Alton.....	365	359	185	100	85
Amherst.....	242	233	180	110	70
Antrim.....	314	322	81	55	26
Atkinson.....	87	88	75	52	23
Barnstead.....	335	331	45	35	10
Barrington.....	320	318	34	30	4
Bath, town.....			19	19	
Bath, special.....	255	250	15	15	
Belmont.....	298	307	105	60	45
Benton.....	39	39	27	27	
Bethlehem, town.....			18	18	
Bethlehem, special.....	318	313	28	28	
Boscawen, town.....			60	36	24
Boscawen, special.....	281	286	12	12	
Bradford.....	244	240	58	24	34
Brentwood.....	136	134	35	24	11
Bridgewater.....	60	60	15	15	
Brookfield.....	73	72	25	25	
Brookline.....	135	125	59	34	25
Campton.....	227	227	70	52	18
Candia.....	267	261	113	60	53
Canterbury.....	158	160	50	35	24
Carroll.....	124	123	65	65	
Centre Harbor.....	109	106	30	30	
Chester.....	204	201	100		
Chesterfield.....	160	156	152	98	54
Chichester.....	181	184	39	25	14
Claremont.....	1,460	1,463	86	61	25
Columbia.....	146	142	75	45	30
Conway.....	725	718	640	415	225
Cornish.....	229	225	74	44	30
Croydon.....	110	101	39	30	9
Dalton.....	110	108	34	19	15
Danbury.....	156	155	158	100	58
Danville.....	130	121	22	22	
Deerfield.....	286	289	74	59	15
Deering.....	104	104	22	13	9
Derry, town.....			85	60	25
Derry, special.....	965	971	18	12	6
Dublin.....	98	96	122	77	45
Dummer.....	64	65	34	34	
East Kingston.....	111	107	20	20	
Easton.....	49	48	20	20	
Effingham.....	154	156	35	35	
Epping.....	333	331	32	23	9
Epsom.....	185	184	58	35	23
Enfield.....	389	385	150	150	
Exeter.....	971	962	1,222	576	646
Farmington, town.....			33	21	12
Farmington, special.....	722	721	175	88	87
Fitzwilliam.....	178	171	226	144	82
Francestown.....	159	160	66	28	38
Freedom.....	180	174	105	105	
Fremont.....	140	139	30	22	8
Gilford.....	189	193	94	60	34
Gilsum.....	125	118	80	40	40



VOTE OF DISTRICT SCHOOL MEETING, 1908.—  
*Continued.*

TOWNS.	Vote for president 1908.	Vote for governor 1908.	Total vote at school meeting 1908.	Men.	Women.
Goshen .....	94	91	50	20	30
Grafton .....	185	184	35	20	15
Greenfield .....	130	130	50	20	30
Greenville .....	243	239	53	38	15
Hampstead .....	193	186	81	75	6
Hampton .....	370	349	14	12	2
Hampton Falls .....	142	133	43	43	
Hancock .....	189	194	71	35	36
Hanover, town .....			50	45	5
Hanover, special .....	577	571	16	11	5
Haverhill .....			175	100	75
Haverhill, Woodsville .....	806	791	62	38	24
Hebron .....	54	56	35	20	15
Henniker .....	365	366	75	45	30
Hill .....	170	170	132	84	48
Holderness .....	147	146	64	63	1
Hollis .....	223	220	92	48	44
Hooksett .....	358	354	192	98	94
Hopkinton .....	428	417	121	73	48
Hudson .....	318	315	200	100	100
Jaffrey .....	313	306	150	75	75
Jefferson .....	270	268	150	125	25
Kensington .....	107	100	31	25	6
Kingston .....	280	273	32	25	7
Lancaster, town .....			28	22	6
Lancaster, special .....	776	768	25	23	2
Langdon .....	89	88	42	42	
Lebanon, town .....			28	18	10
Lebanon, special .....			100	50	50
Lebanon, West .....	1,135	1,125	83	57	26
Lincoln .....	113	113	12	6	6
Litchfield .....	67	65	41	25	16
Londonderry .....	271	273	53	23	30
Loudon .....	266	268	60	42	18
Lyme .....	226	225	70	70	
Lyndeboro .....	175	177	29	17	12
Madbury .....	96	92	52	52	
Madison .....	135	134	66	60	6
Marlow .....	123	122	17	8	9
Mason .....	82	84	83	47	36
Merrimack .....	266	260	65	30	35
Middleton .....	81	80	114	65	49
Milford .....	748	722	250		
Monroe .....	110	107	54	44	10
Moultonboro .....	263	260	180	180	
Nelson .....	67	64	45	41	4
Newcastle .....	127	128	75	75	
Newfields .....	153	148	23	21	2
New Hampton .....	186	180	53	25	28
Newington .....	78	79	150	75	75
New London .....	255	255	100		
Newmarket .....	400	401	175	100	75
Newton .....	259	246	40	40	
Northwood .....	250	242	122	107	15
Orange .....	48	49	11	11	
Orford .....	187	187	80	63	17
Ossipee .....	391	397	200	200	
Pelham .....	220	202	12	10	2
Pembroke .....	513	508	90	55	35
Piermont .....	167	168	67	39	28
Pittsfield .....	557	547	241	119	122



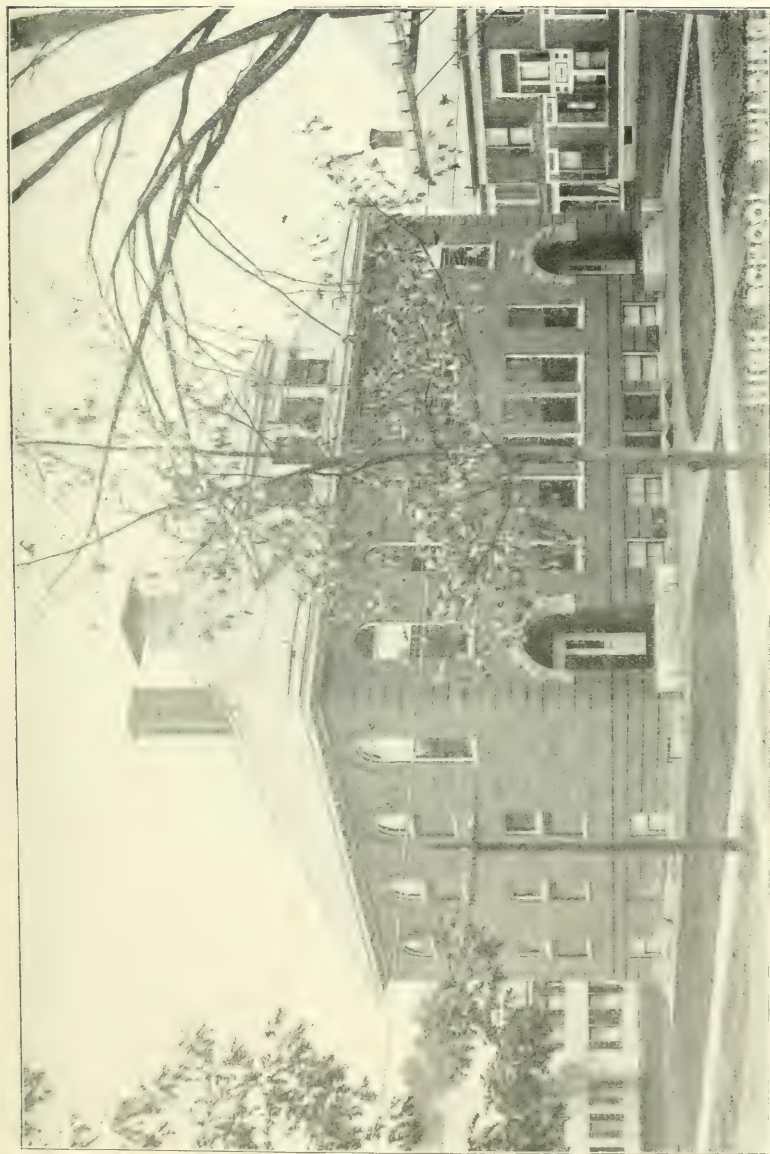
VOTE OF DISTRICT SCHOOL MEETING, 1908.—  
*Continued.*

TOWNS.	Vote for president 1908.	Vote for governor. 1908.	Total vote at school meeting 1908.	Men.	Women.
Plainfield .....	234	227	85	54	31
Plaistow .....	158	157	21	21	.....
Plymouth .....	564	559	146	69	77
Richmond .....	88	85	33	26	7
Rindge .....	165	157	103	62	41
Salem .....	402	397	164	90	74
Salisbury .....	170	170	14	10	4
Sanbornton .....	224	226	14	13	1
Sandown .....	104	103	60	32	28
Seabrook .....	321	330	99	85	14
Shelburne .....	59	58	12	12	.....
Stark .....	134	135	90	90	.....
Stoddard .....	64	64	43	35	8
Strafford .....	283	282	58	36	22
Stratford .....	202	200	135	135	.....
Stratham .....	177	175	20	17	3
Sullivan .....	66	68	55	36	19
Sunapee .....	285	281	200	100	100
Surry .....	62	61	20	13	7
Sutton .....	198	198	66	40	26
Tamworth .....	230	228	108	76	32
Thornton .....	138	126	37	37	.....
Tilton, town .....	.....	.....	27	21	6
Tilton, Union .....	455	447	28	18	10
Unity .....	131	128	41	22	19
Wakefield .....	398	389	51	51	.....
Walpole .....	552	524	140	80	60
Warner .....	332	333	83	41	42
Warren .....	219	216	129	65	64
Weare .....	395	390	60	33	27
Webster .....	142	139	51	47	4
Westmoreland .....	138	141	85	55	30
Wilmot .....	173	172	75	50	25
Wilton .....	383	376	52	20	32
Winchester .....	494	478	533	.....	.....
Windham .....	132	129	43	30	13
Windsor .....	7	7	6	6	.....
Wolfeboro .....	627	631	169	121	48
Woodstock .....	191	191	21	8	13

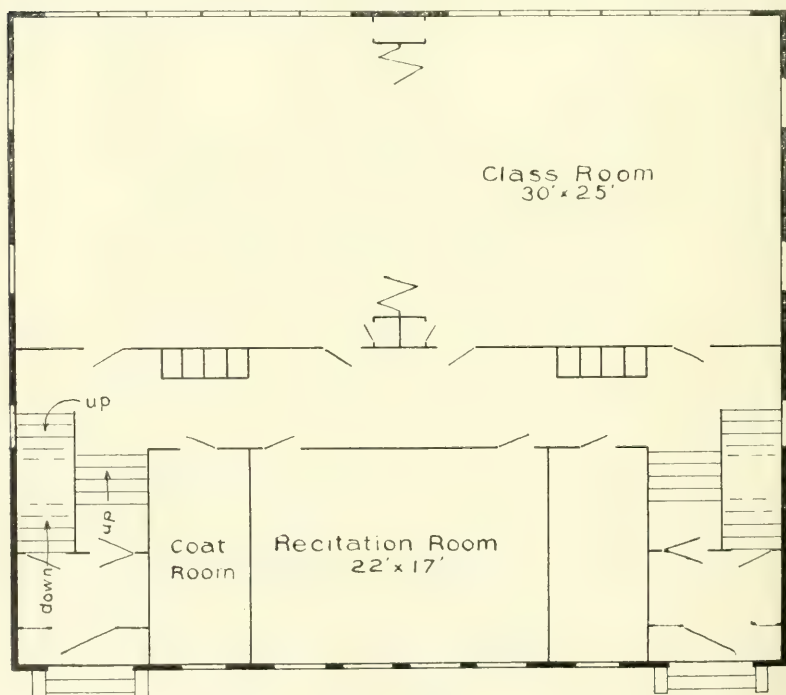
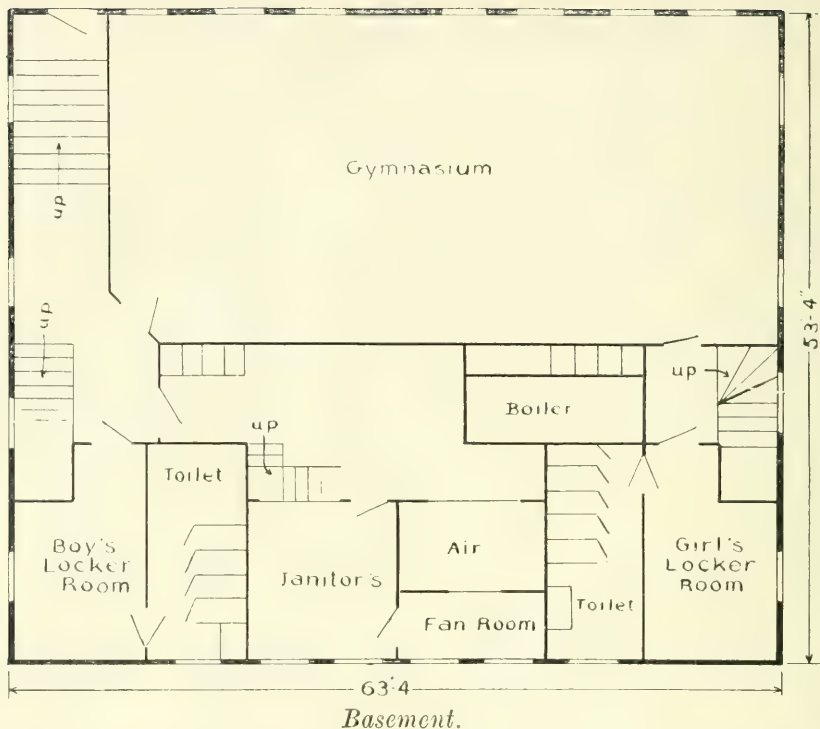
## APPENDIX J.

Showing typical schoolhouses recently erected with floor plans and other data.

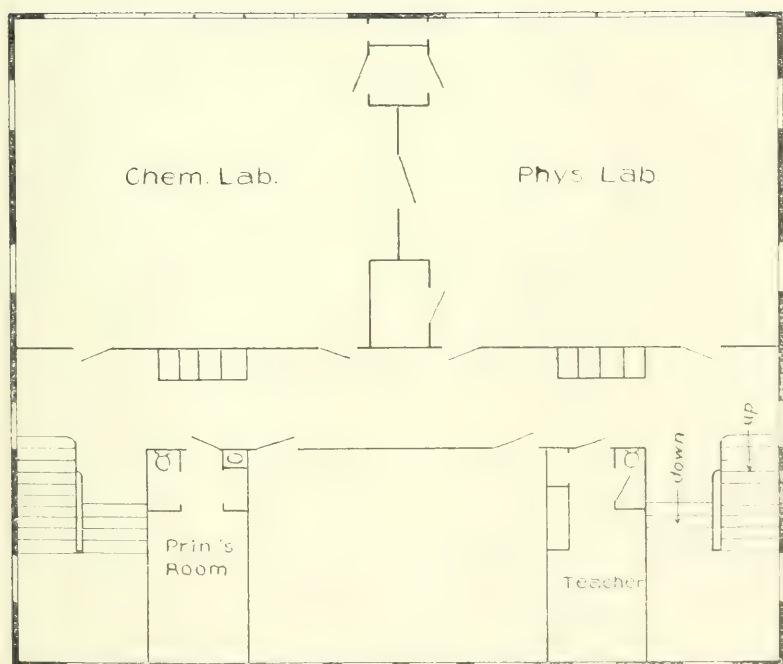




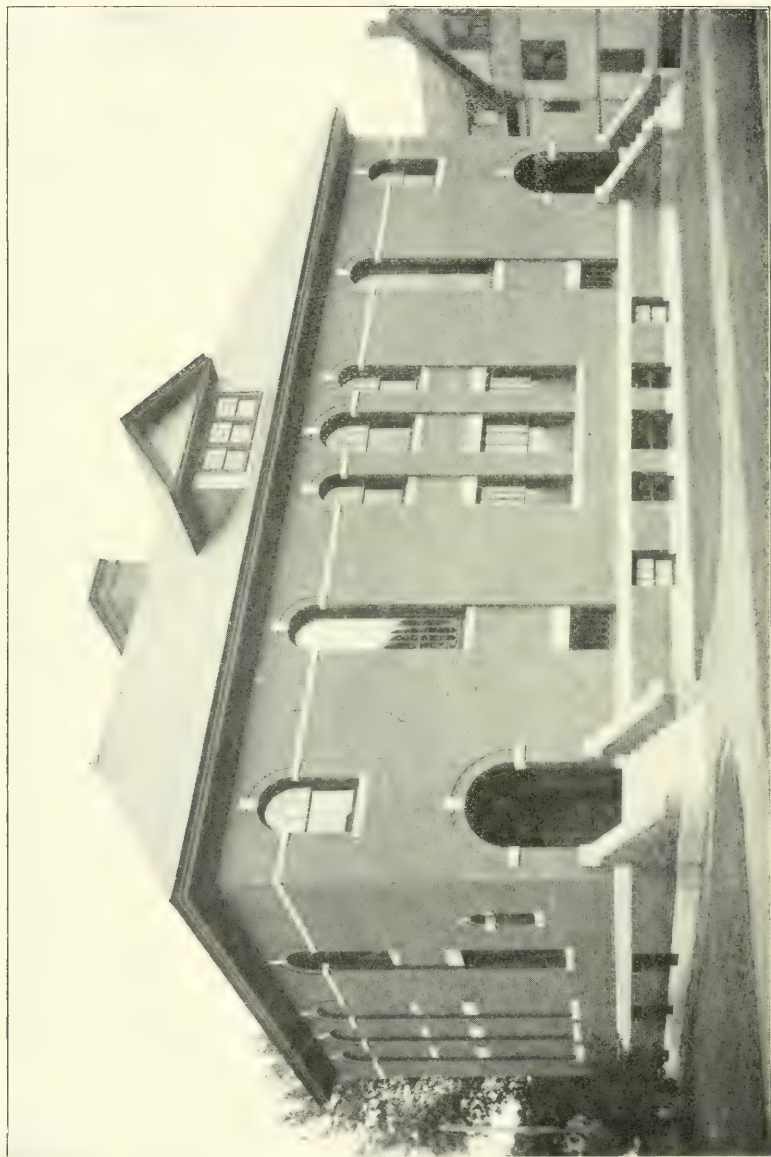
High School Building, Lebanon.  
Cost, \$25,000. Normal capacity, 75 pupils.  
A good type of village high school.



Floor plans of Lebanon High School.



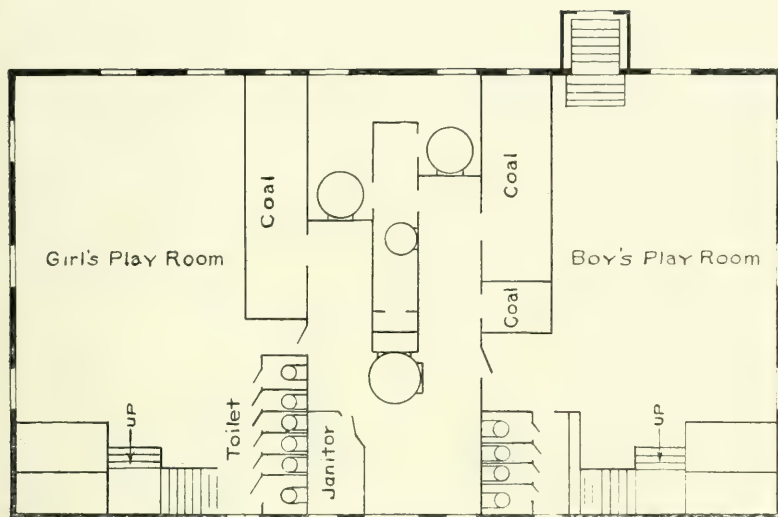
*Second Floor.*



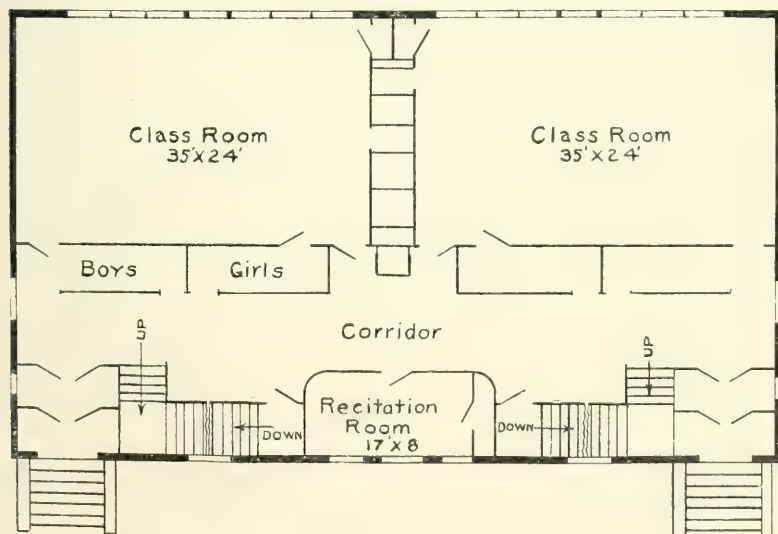
FRANKLIN ELEMENTARY SCHOOL, KEENE.

Cost, \$15,500. Normal capacity, 168 pupils.



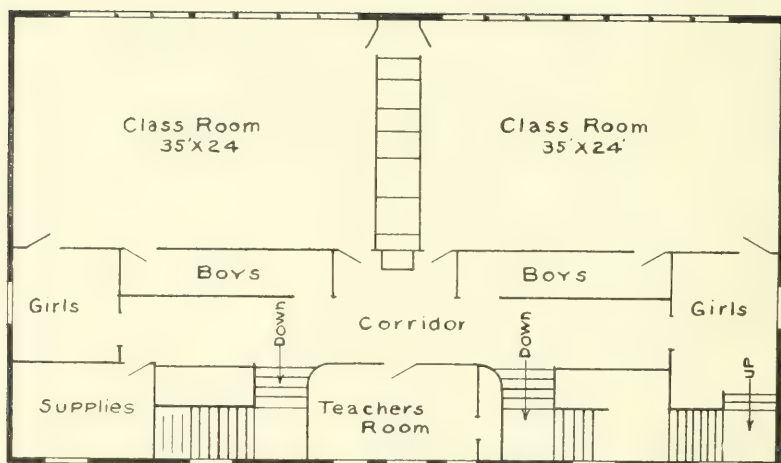


*Basement.*

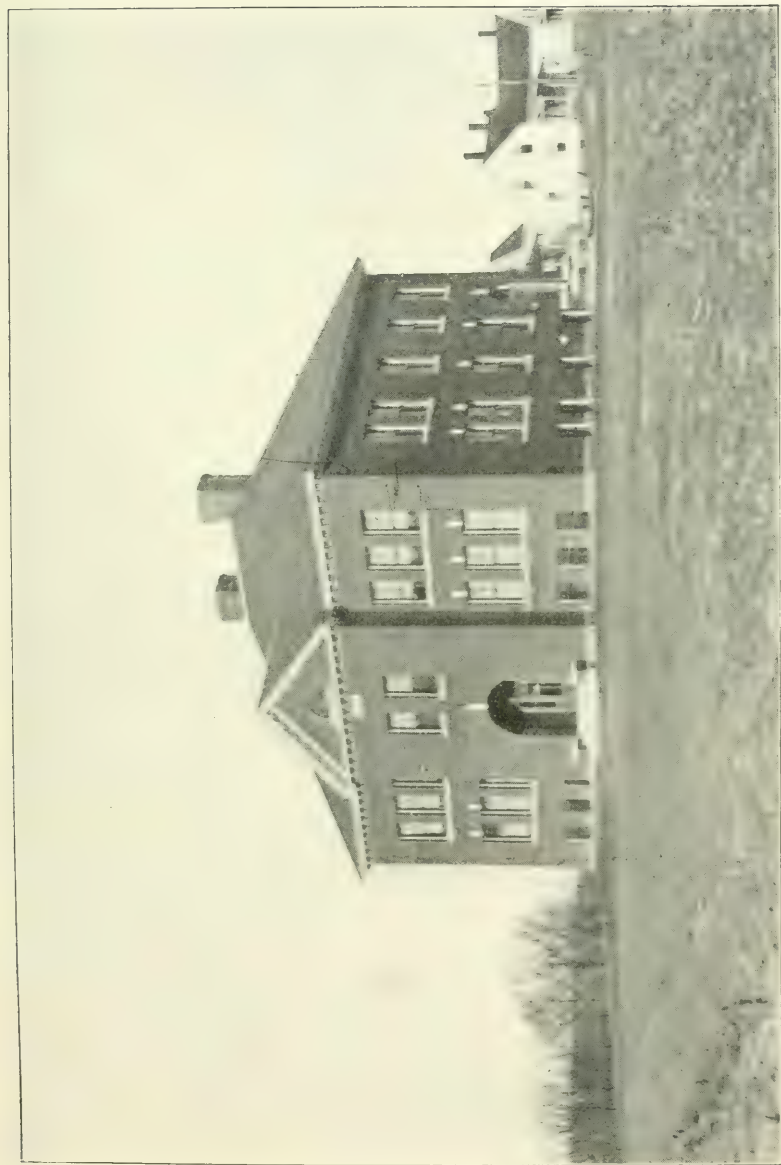


*First Floor.*

Floor plans of Franklin School, Keene.

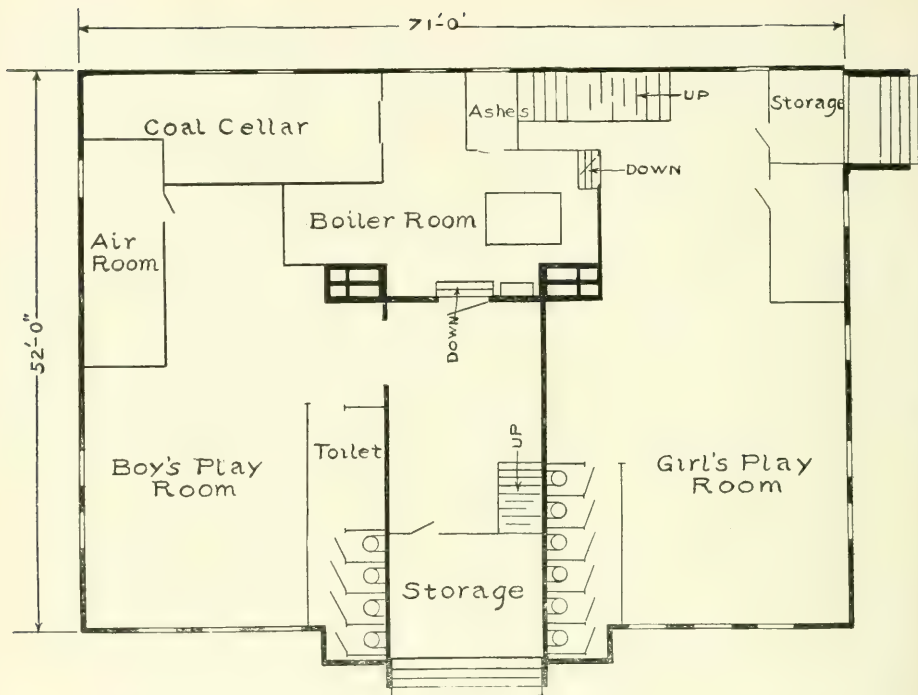


*Second Floor.*

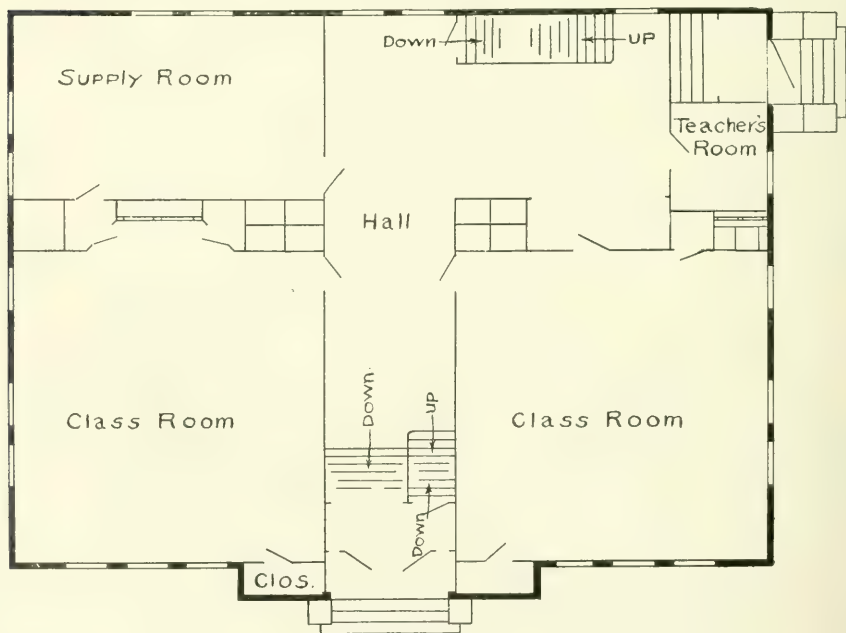


ELEMENTARY SCHOOL, PEMBROKE.

Cost complete, without lot, \$17,902.36. Normal capacity, 216 pupils.

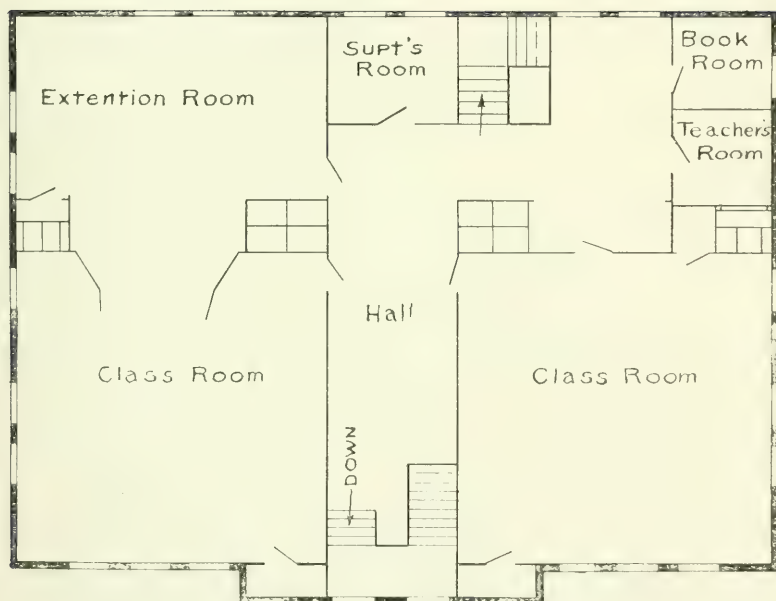


*Basement.*

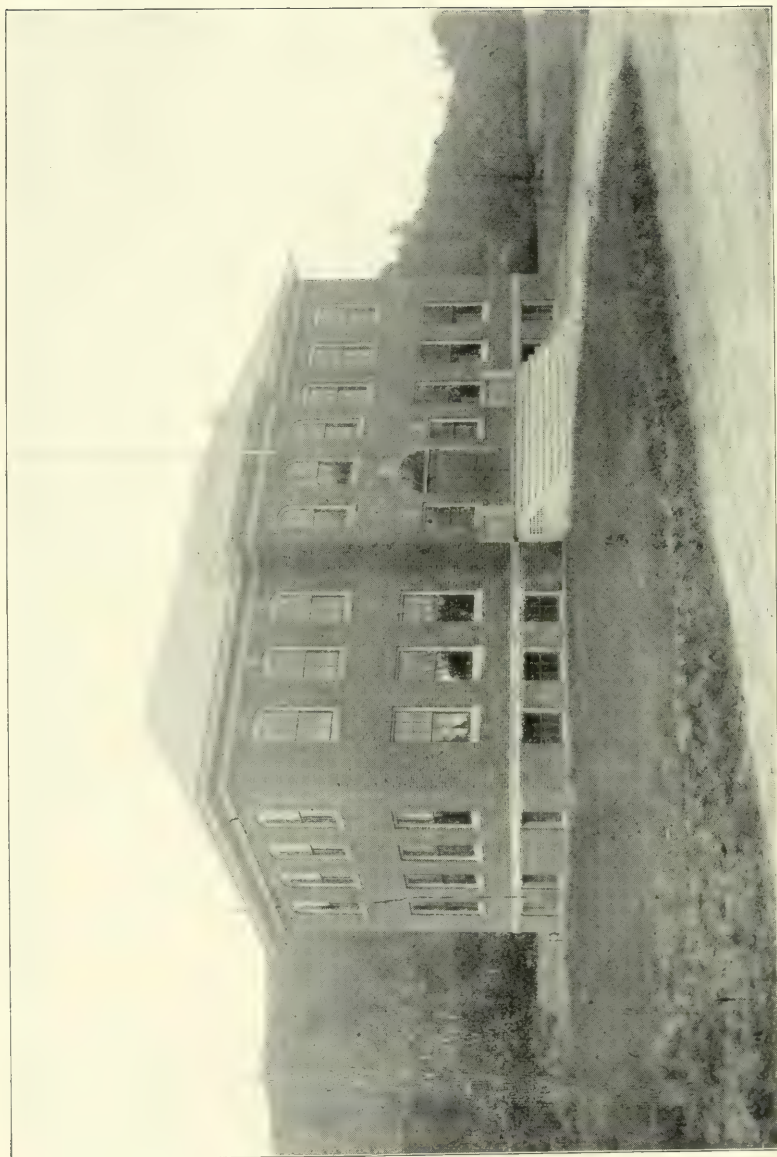


*First Floor.*

Floor plans of Pembroke School.

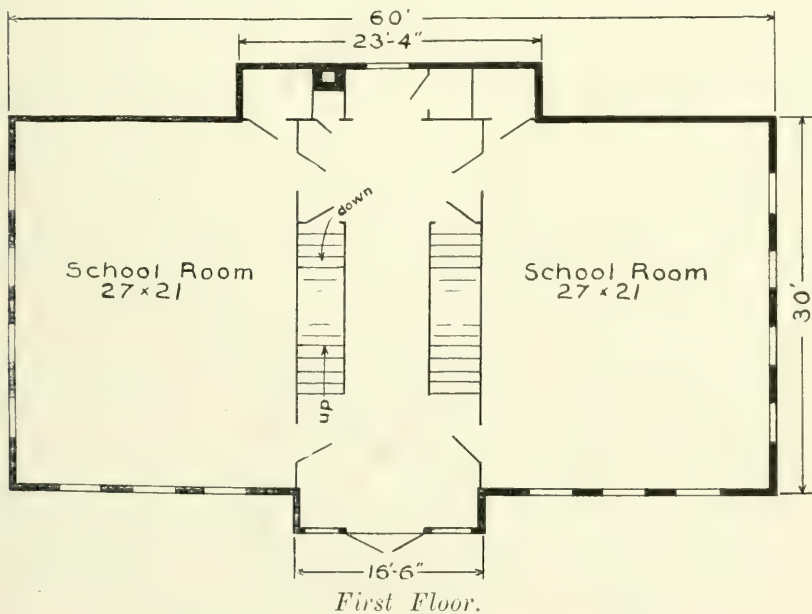
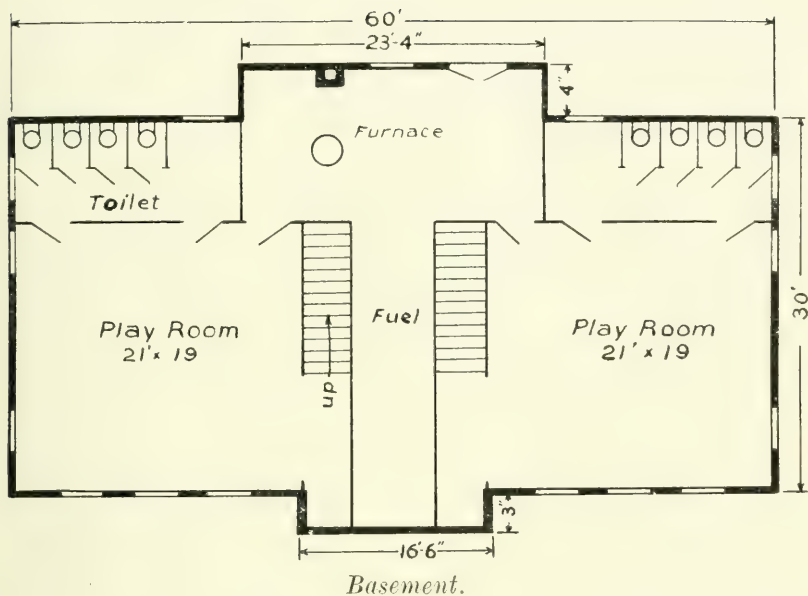


*Second Floor.*



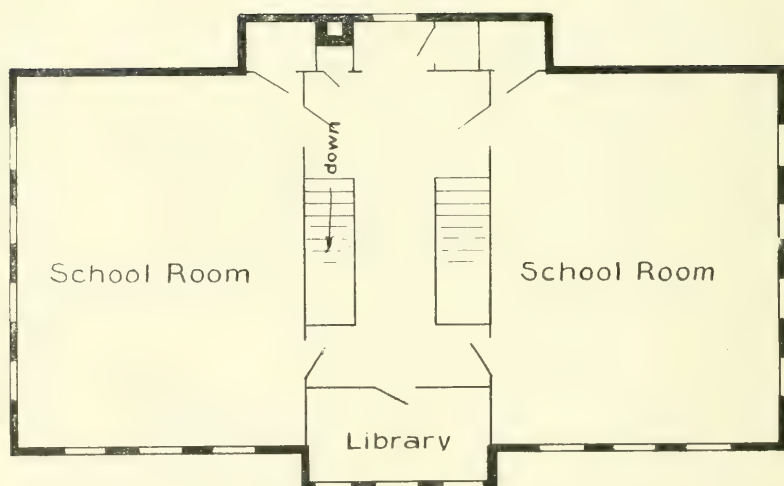
ELEMENTARY SCHOOL, LEBANON TOWN DISTRICT.

Cost, \$8,600. Normal capacity, 112 pupils.

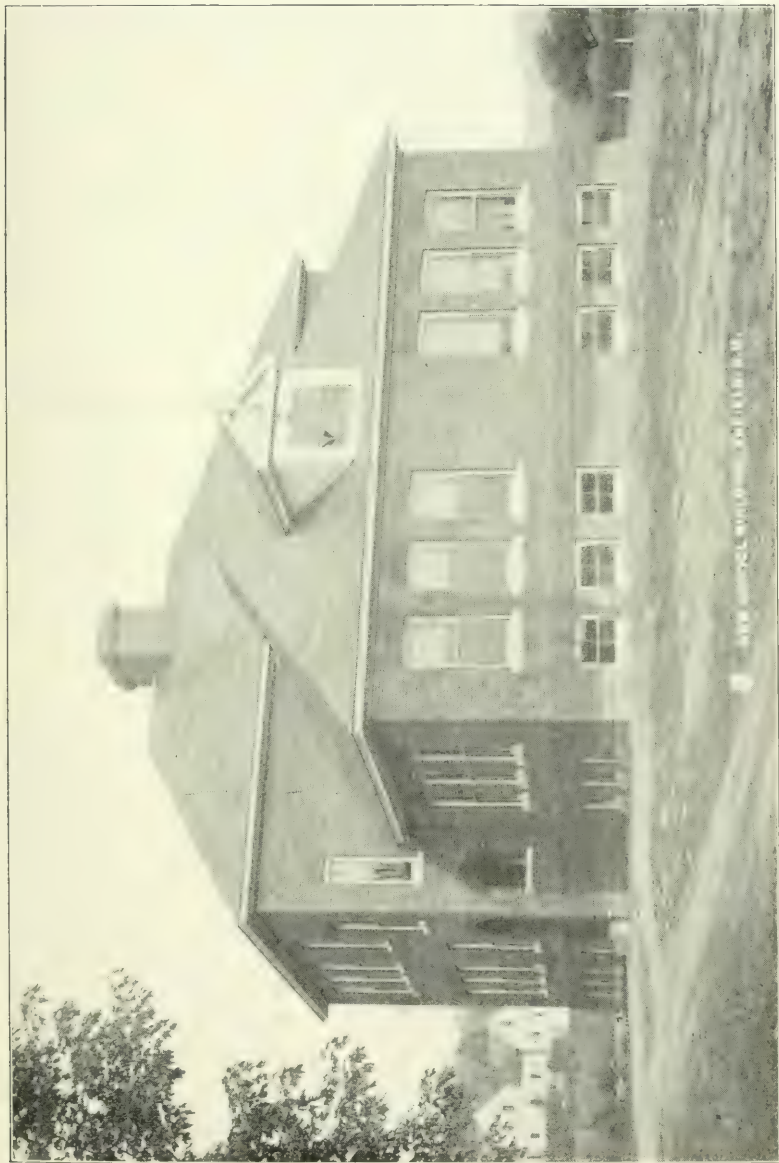


Floor plans of Lebanon Town District School.



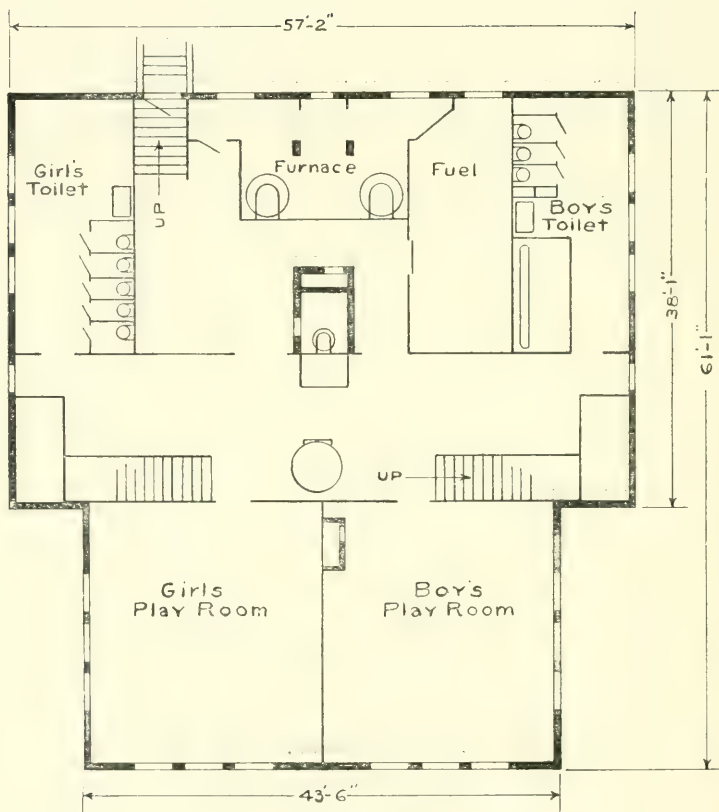


*Second Floor.*



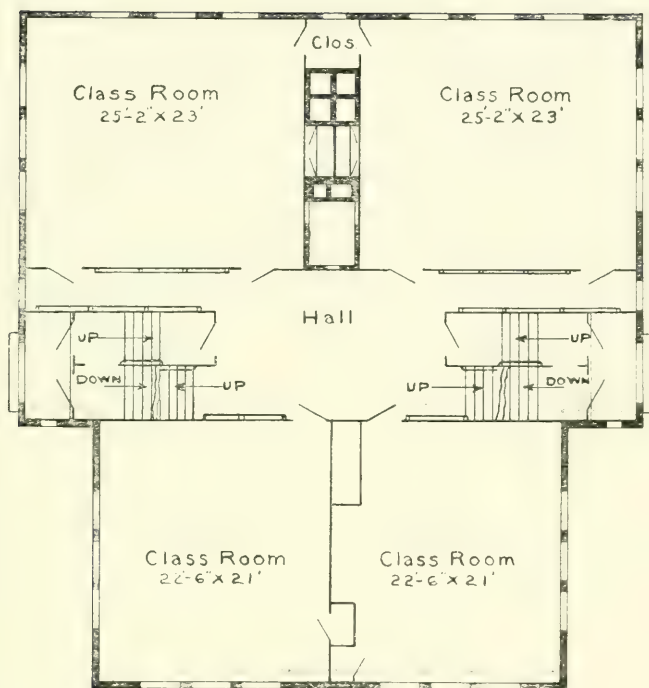
ENFIELD VILLAGE SCHOOL.

Type of combined elementary and high school building for village or consolidated rural schools.  
Cost, \$12,500. Normal capacity, 168 pupils.

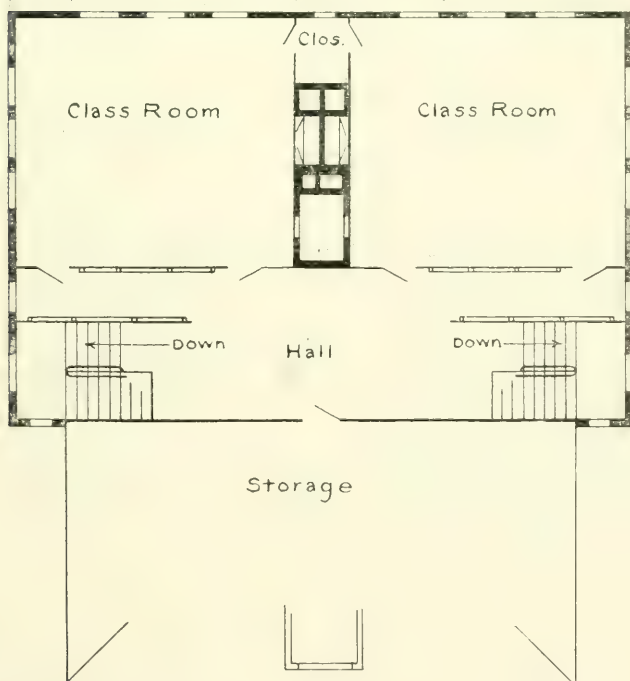


*Basement.*

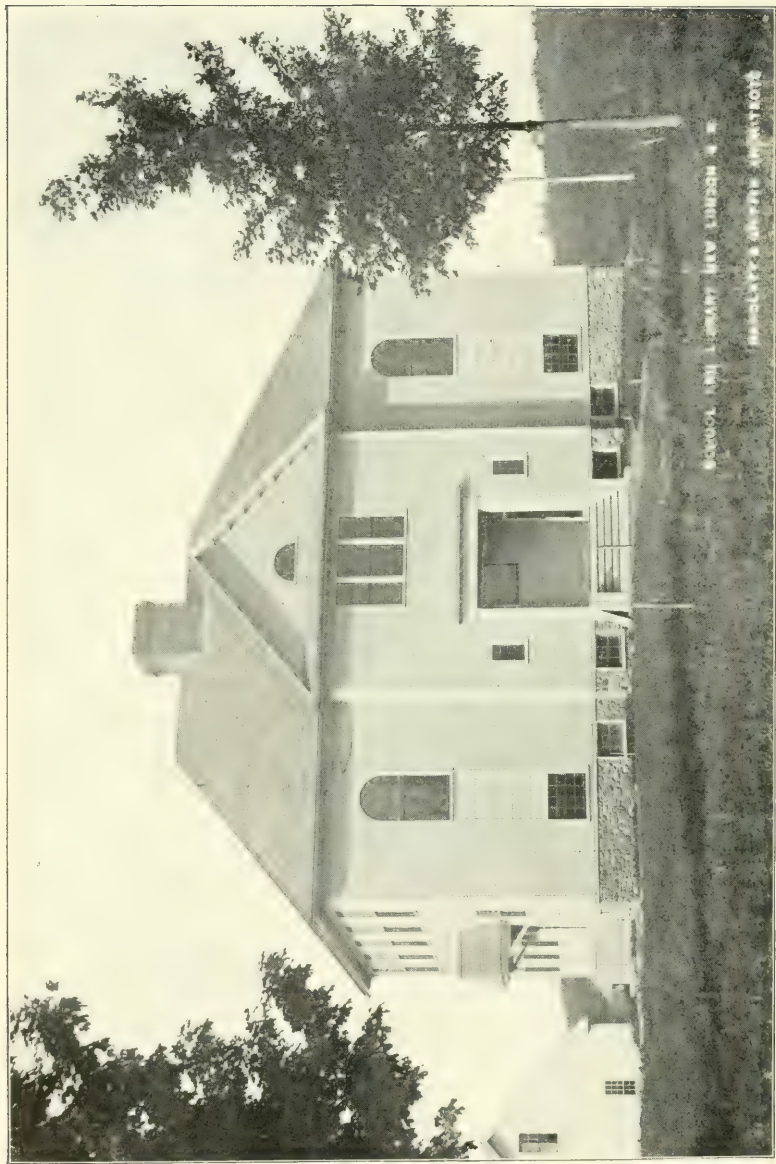
Floor plans of Enfield School.



*First Floor.*



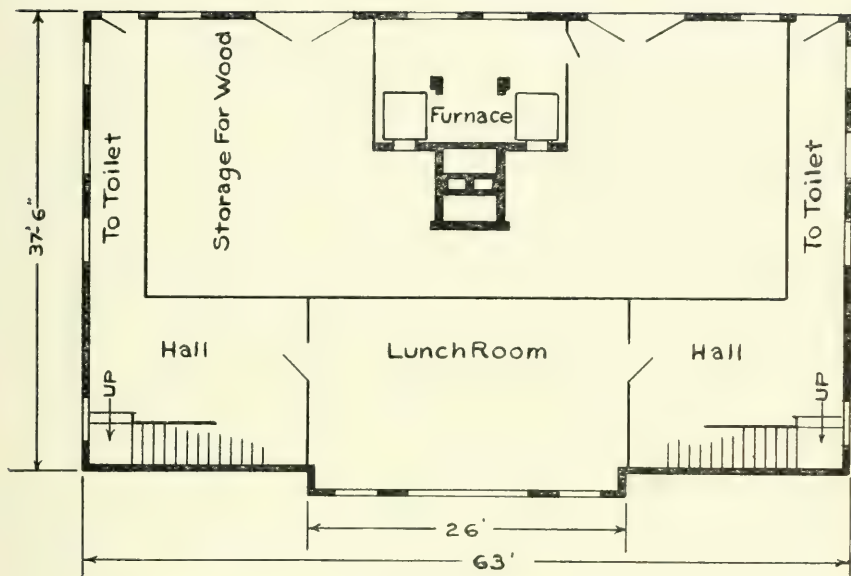
*Second Floor.*



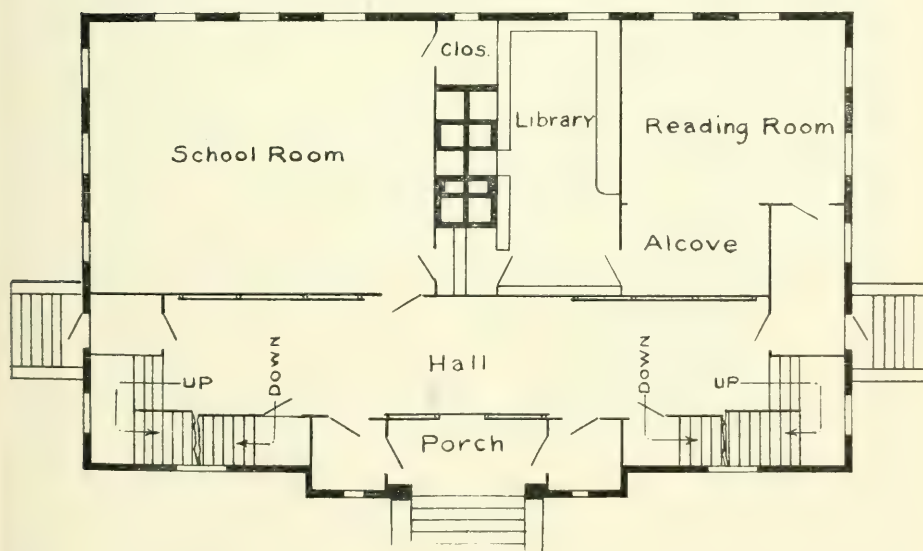
ELEMENTARY SCHOOL, NEW LONDON.

Type of village or consolidated rural elementary school.

Cost, \$8,000. Normal capacity, 120 pupils.

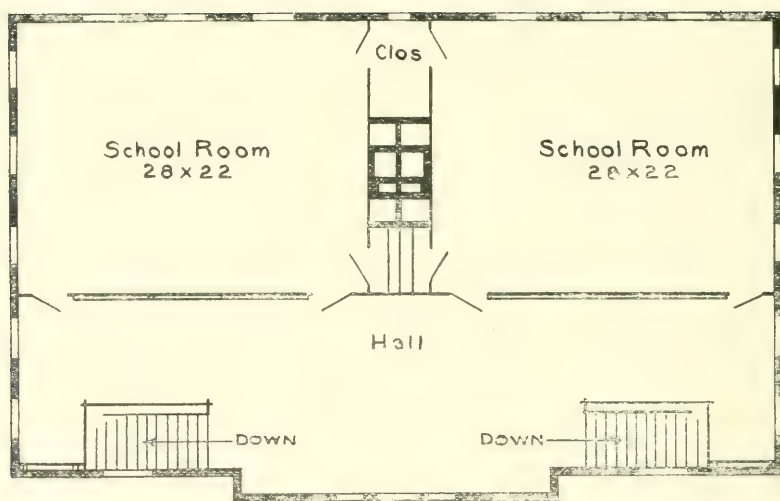


*Basement.*



*First Floor.*

Floor plans of New London School.



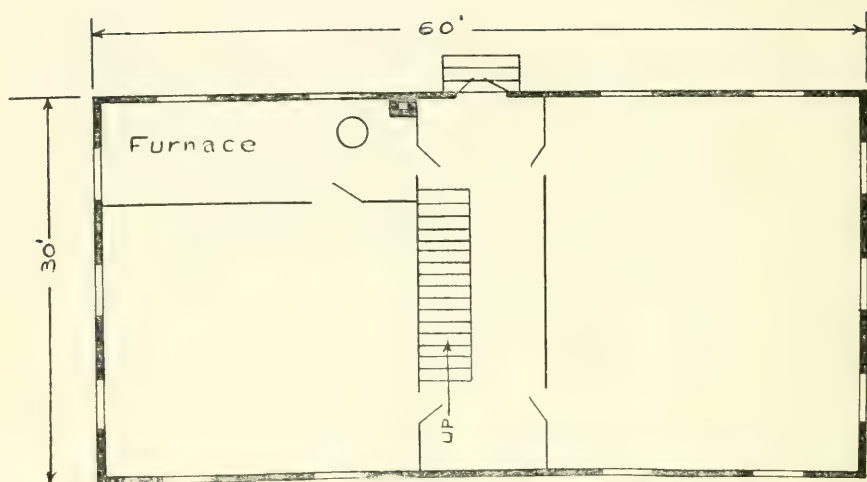
*Second Floor.*



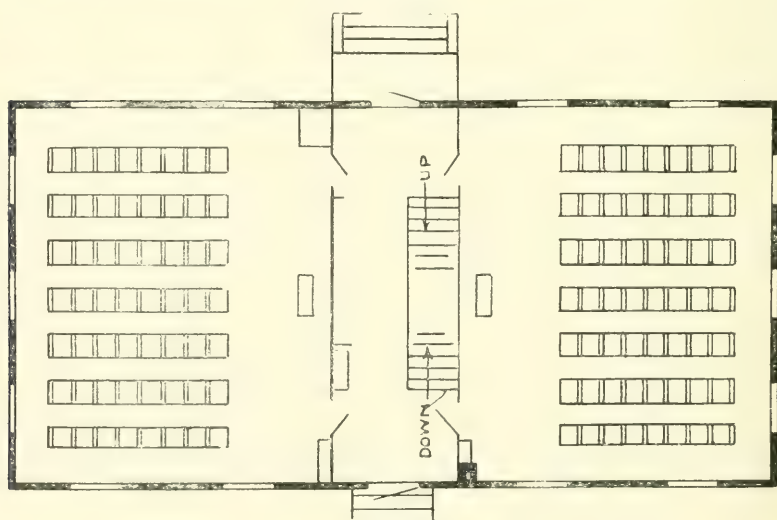


ELEMENTARY SCHOOL, LYME.

Consolidated rural type. Normal capacity, 120 pupils.

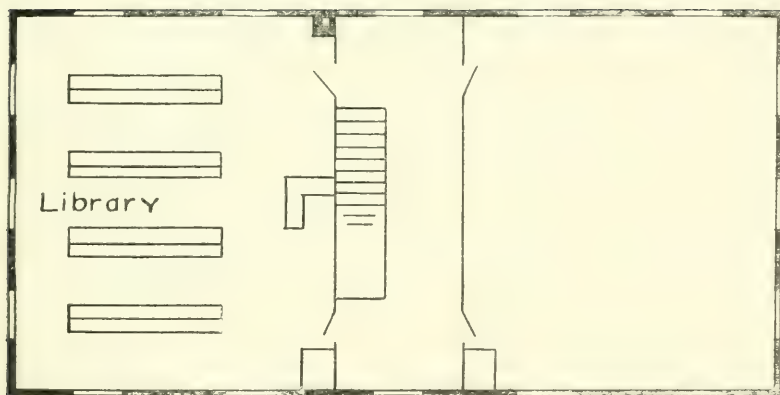


*Basement.*

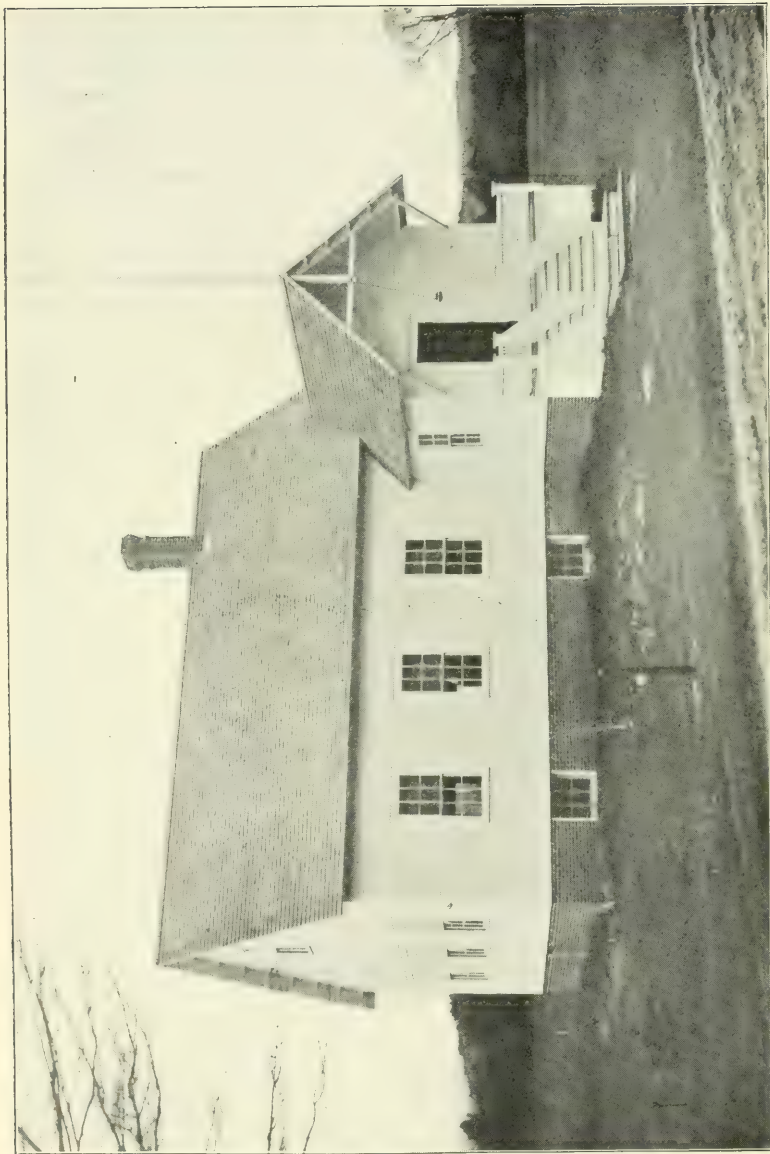


*First Floor.*

Floor plans of Lyme School.



*Second Floor.*

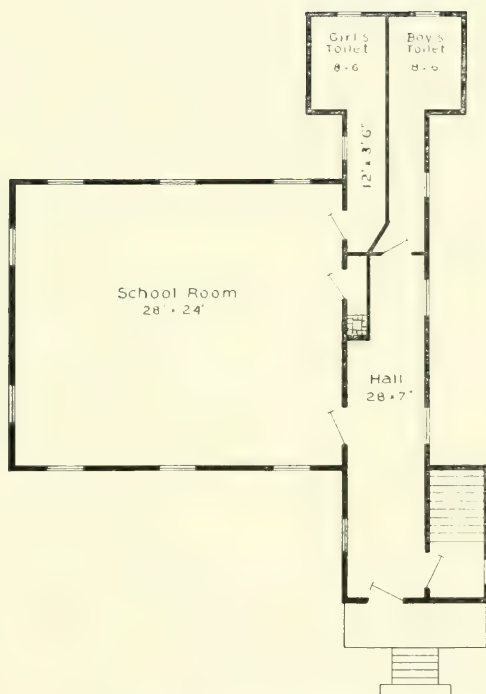


RURAL ONE-ROOM SCHOOL, FRANKLIN.

Excellent building for this type of school.

Cost, \$1,860, including lot and all furnishings. Normal capacity, 34 pupils.

Building heated and ventilated by furnace in cellar.



Floor plan of the Morrison Schoolhouse, Franklin.



## ERRATA.

---

Page 39, "New Hampton Literary Institute" should read "New Hampton Literary Institution."

Page 77, total practitioners licensed, read "51" instead of "15."

Page 107, "John W. Bowker" should read "John W. Bowler."

Page 165, "Franconia special" should read "Bethlehem special."

Page 226, "Anthropods" should be "Arthropods."

Page 355, line 3, for "prevailing," read "prevalent."

## ADDENDA.

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Page 217, "and surveying" after New Hampton.





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TWENTY-NINTH REPORT

OF THE

BOARD OF TRUSTEES

OF THE

NEW HAMPSHIRE COLLEGE

OF

AGRICULTURE AND THE MECHANIC ARTS

DURHAM, NEW HAMPSHIRE

TO THE

NEW HAMPSHIRE LEGISLATURE

---

SEPTEMBER 1, 1908

PRINTED BY TELEGRAPH PUBLISHING CO., NASHUA.  
BOUND BY GEORGE G. NEAL, DOVER.

TWENTY-NINTH REPORT OF THE BOARD OF  
TRUSTEES OF THE NEW HAMPSHIRE COLLEGE  
OF AGRICULTURE AND THE MECHANIC ARTS  
FOR THE TWO YEARS ENDING AUGUST 31,  
1908.

---

*To His Excellency the Governor and the Honorable Senate and  
House of Representatives of New Hampshire.*

DURHAM, N. H., September 1, 1908.

I have the honor of transmitting herewith the report of the  
New Hampshire College of Agriculture and the Mechanic Arts  
for the two years ending August 31, 1908.

Yours respectfully,

CHARLES W. STONE,

*President of the Board of Trustees.*

## REPORT OF THE PRESIDENT

---

DURHAM, N. H., September 1, 1908.

*Hon. Charles W. Stone, President of the Board of Trustees:—*

SIR:—This biennial report contains the following:

First. Detailed statements as to the financial condition and transactions of the College from July 1, 1906 to August 31, 1908, including the annual reports submitted to the United States Government, covering the administration of the Morrill, Hatch, and Adams funds. All financial reports have been audited by the College auditor and approved by the Board of Trustees. In addition, all reports of funds appropriated by the United States Government have been approved by government officials designated for that purpose.

Second. The College catalog.

Third. The 19th and 20th annual reports of the Agricultural Experiment Station, covering the two fiscal years July 1, 1906 to June 30, 1908 and the work of the station to September 1, 1908.

Fourth. Meteorological records July 1, 1906 to June 30, 1908.

### NEW BUILDINGS.

**Library.**—Since the publication of the last biennial report the new Hamilton Smith Public Library of the New Hampshire College has been completed and equipped. The building is located on the high ground north-east of Thompson Hall and is one of the most beautiful and imposing buildings on the campus. It is of red pressed brick with buff Indiana trimmings and slate roof. It has ample reading and reference rooms, also seminar and study rooms and a large historical collection room, besides librarians' offices and a three story stack room with a capacity of sixty thousand volumes. The building cost \$32,888 of which Mr. Andrew Carnegie furnished \$20,000 and the Hamilton Smith estate of Durham \$12,888. The equipment, costing \$8,500, was provided by legislative appropriation. The consolidated library also receives the benefit of the invested funds of the Durham Library Association, and of the Durham Public Library. The library contains 23,000 volumes and is managed and maintained by the college for the free use of faculty, students, and citizens of Durham.

**Smith Hall.**—New Hampshire College is co-educational and has always admitted men and women upon equal terms. However, the attendance of young women has been comparatively small owing to the impossibility of providing suitable homes for them in Durham. This difficulty has been now overcome by the erection of Smith Hall, occupied September, 1908, with a competent matron in charge. This building was made possible by the generosity of Mrs. Shirley Onderdonk, of Durham, who gave \$16,000 as a memorial to her mother, Mrs. Alice Hamilton Smith. The balance of the cost, \$10,000, was provided by the state.

Smith Hall is a three and one-half story brick building, 86 feet long by 36 feet deep, built in "old English" style, with granite trimmings and gable roof, having a square vestibule projection over the main entrance and a piazza around the west end and a part of the north side. The main entrance faces the south and opens into a large hall-way.

On the right of the entrance is the dining room and to the left a handsome reception room. In the rear of the reception room are the office and apartments of the matron; back of the dining room are the serving room, kitchen and pantry. In the basement are the boiler room, trunk room, drying room, laundry, and rooms for storage and fuel. The second and third floors are for student accommodations, each floor being equipped to accommodate sixteen students, and provided with toilet rooms and baths (shower and tub).

The building is heated by steam and lighted by electricity. The interior finish is stained cypress, with hard wood floors.

The dormitory presents a fine appearance, and is a splendid addition to the college plant. In the future our women students will find, in Smith Hall, as comfortable and pleasant college accommodations as are provided anywhere in New England.

#### GIFTS.

Since the publication of the last biennial report the following gifts have been made to the College:

Andrew Carnegie, New York, Library.....	\$20,000.00
Hamilton Smith Estate, Durham, N. H., Library.....	12,888.00
Mrs. Shirley Onderdonk, Durham, N. H., Woman's building .....	16,000.00
Robert P. Bass, Peterboro, N. H., Student loan fund..	25.00
Pearson Estate, Concord, N. H., Student loan fund...	600.00
Total .....	<hr/> \$49,513.00

## STUDENT ENROLLMENT.

Year.	Total Enrollment.	Total 4 Yr. Classes.
1893	64	64
1894	108	91
1895	112	79
1896	105	84
1897	136	73
1898	99	71
1899	134	72
1900	139	79
1901	131	91
1902	111	98
1903	134	106
1904	159	118
1905	195	146
1906	212	164
1907	203	176
1908	225	192

## NEEDS OF THE COLLEGE.

**Creamery.**—The creamery building, put up as a temporary wooden structure many years ago has reached a state of delapidation which will no longer permit of its being used as a place in which to give modern instruction in dairying. A suitable new building must be provided at the earliest possible date.

**Engineering Building.**—There is pressing need of a building in which to house the Departments of Mechanical and Electrical Engineering and Physics. These departments are now occupying the same space that they did when the college was first established at Durham, notwithstanding the fact that we now have three and one-half times as many students as we then had, and that our teaching force has been greatly enlarged. All of the engineering laboratories, class rooms, offices and shops are badly over crowded, with the deplorable result that the instruction given is not as efficient as it ought to be.

The Departments of Chemistry are seriously handicapped for space. It is a fact that not more than one-half the instruction in Chemistry is given that should be because of lack of desk and laboratory room. Every year many students are refused admission to the Chemical Engineering Course for this reason. For the same reason our Agricultural and General Course students are denied the privilege of taking advanced courses in Analytical

**Chemistry.** Given a new engineering building the whole of Conant Hall, the science building, would be set apart for Chemistry. Even with this arrangement only the immediate needs of the Chemical Department would be provided for.

An engineering building is absolutely necessary if we are to do creditable work in these important departments.

**Water Supply and Sewerage.**—The college buildings are now supplied with water from an open reservoir which furnishes an abundance of water suitable for boilers, watering plants and for fire protection. However, it is wholly unfit, and is not used, for drinking purposes. Drinking water is carried from nearby springs. Probably the boring of two or more wells near the power house would provide sufficient pure water for all ordinary college uses, leaving the reservoir water in reserve to be used in case of fire. The college needs pure water not only for drinking but for laboratory purposes as well.

The lack of a sewerage system in the village is a menace to the health of students and townspeople alike. Provision should be made at once for co-operation between the college and the village to remedy this evil.

**Repairs of Buildings.**—Many of the college buildings are badly in need of paint and other repairs. At least \$1,000 should be spent on them next summer.

**Grading.**—The grading at the Library, Smith Hall, and Gymnasium has not been completed owing to the lack of funds. Provision should be made for these improvements at an early date.

**Agricultural Department.**—The Agricultural department is in great need of a piggery, a manure shed, and additional live stock.

**Dynamo.**—The dynamo which now supplies light for our buildings has been entirely outgrown. It has a capacity of but 500 lights. We have 1,200 lights in our buildings.

**Athletic Field.**—The athletic field has a good natural location but needs improving. A running track, covered grand stand, and a fence should be provided.

## REPORTS OF HEADS OF DEPARTMENTS.

### Department of Mathematics.

The most urgent need of the Mathematics Department is an assistant who shall devote his whole time to this specialty. Hitherto assistants in other departments have been drafted to hear special classes in mathematics. The work has been frag-



mentary and secondary, and the best results impossible. An instructor in mathematics should have special training in his subject and should be selected with reference to his ability to teach such special subject. Moreover, a thorough inspection of students' examples and tests requires more work than can possibly be done by the present teaching force.

The equipment for surveying will necessarily be increased the present year by the addition of a transit; other instruments will be required in the near future for our enlarged classes.

C. H. PETTEE,

*Professor of Mathematics.*

#### **Department of History and Political Economy.**

The Department of History and Political Economy was established as the result of certain changes made about fourteen years ago. In the work of the department were included several new courses and several old courses which I had given for about fifteen years. Among the latter were a course in Political Economy, a course in American Constitutional Law, a course in Business Law, and a course in American Literature. The larger part of the courses in History either was intended for preparatory students, or represented the work now done in good high schools.

Gradually the elementary courses in History have been replaced by advanced work suitable for students who have had the excellent historical courses now given in New Hampshire high schools. Also various changes have made the work of the department about fifty per cent. greater than it was when it was established.

The work of the department includes courses frequently divided among the departments of Economics, Political Science, European History and American History. In teaching nearly every one of the courses now given, there is need of persistent study and extensive reading. Under the present conditions of college work no one instructor can do justice to more than a part of them.

The present courses in American History, American Literature and American Constitutional Law compare fairly well with those given in the average New England college. The courses in European History allow the student to take the subject for two years. As the high schools now give three years to European History and as this college may be expected to prepare teachers for high school work, the courses in European History should, at

the least, be doubled. In fact, it is not unlikely that in a few years it may become necessary to establish a Department of European History.

There is need of additional courses in Political Science and particularly in Economics. The number of such courses that may be needed will depend somewhat upon the number of students desiring a General Course. I expect a large increase in the number of such students and in particular in the number of women students.

The number of students in my department this semester is fifty per cent. greater than the number in the department one year ago.

Respectfully presented,

C. W. SCOTT,

*Professor of History and Political Economy.*

#### Department of Organic Chemistry.

The department is in good condition at the present time and its immediate needs for the work in hand are small. A steam-bath and drying-oven in the Organic Laboratory would facilitate the work of the students in laboratory practice, as they are now obliged to use the outfit in the Quantitative Laboratory. Such an outfit would cost about \$60 besides the labor and piping necessary for installation.

The most important need of the department is facilities for expansion. At the present time it is giving only required courses to Chemical and Agricultural students, some of which are also elective for General Course students. The number of students averages a little over one-third of each sophomore and junior class. There should be opportunity for elective courses for the Chemical students, since there is an enormous amount of material in pure and technical organic chemistry.

There is also no dividing line between organic chemistry and the subjects of plant and animal nutrition, for the advanced study of which the Agricultural students should have opportunities.

The department also carries the courses in Chemistry and Fertilizers of the Two Year Course. The lack of room is especially manifest with these classes in all attempts to arrange hour-plans because there is but one lecture room for all the chemical courses.

Respectfully submitted,

FRED W. MORSE,

*Professor of Organic Chemistry.*

### Department of Inorganic Chemistry.

I desire to report that the Chemical Department of the college is in excellent condition and is crowded to the full extent of its capacity. In fact the greatest need which we have at the present time is larger laboratories and more facilities to meet the demand put upon us.

As is well known to those who are interested in the institution, the Chemical Department has been obliged for some years past to limit the number of students who can take up its special work owing to the fact that the state has not provided sufficient laboratory facilities and appliances to meet the demand. We are limited in the number of students we can handle simply by the number of laboratory desks which are available for use. At the present time there are thirty-six desks in the Qualitative Laboratory and there are many more students than desks, so that the instructors are worked at odd hours and many makeshifts have to be adopted to enable the students to procure the work which is required in their various courses.

In the Advanced Laboratory we are able now to take only such men as have selected the Chemical Course and we are obliged to limit these men to six from each class. It is highly desirable that men in other courses should have the privilege of electing a certain amount of advanced chemical work if they so desire, which is now denied them. This condition is not, however, unique in the Chemical Department, for all of the Engineering Departments are crowded with students to an extent incompatible with the facilities for properly handling their work.

Except for this crowded condition I feel that the Chemical Department is in fairly good condition. Its graduates are received for full post-graduate standing in any of the universities of the country, although the majority immediately go out into lucrative positions. In spite of the present depression in business, there is only one graduate of this department who is unemployed.

In addition to the teaching work the members of the staff and the Senior students have interested themselves so far as time would permit in research upon new chemical problems and a number of articles have been considered worthy of publication in our leading chemical journals, both at home and abroad.

The specific needs of the department are more laboratory space and lecture rooms for our present work and the apparatus and facilities which would be required therefor. It is also hoped that at no distant date the Trustees may find resources to es-

tablish an Assistant Professorship in Physical Chemistry with a laboratory fitted out to do more work along this line, which is becoming so prominent in the chemical life of the country.

I am

Respectfully yours,

CHARLES L. PARSONS.

*Professor of Inorganic Chemistry.*

### Report of Agronomy Department.

On July 1st of this year the Department of Agriculture was subdivided into the Departments of Agronomy and Animal Husbandry. This division has been for the best interests of both departments since more detailed supervision can be given to the respective lines of work.

The work of the Agronomy Department is concerned mainly with soils, fertilizers and the production of field crops upon the college farm, together with the instruction given in these subjects in the regular collegiate and two year courses.

The college farm which is the practical laboratory for most of the courses of instruction consists of approximately 300 acres. Of this area about 30 acres are comprised in the college campus and athletic field. About 20 acres are used by the Horticultural Department and of the remaining 250 acres about 80 are in pasture, 70 in forest and 100 in tillable land. All of the arable fields are gradually increasing in productiveness and are now in a much better state of fertility than when the college first took possession of them eighteen years ago. From the fields where about forty tons of hay were cut at that time over one hundred tons are cut now.

Within the past four years a considerable amount of material and labor has been expended in the work of permanent farm improvement, such as the establishment of uniform size plots for experiment purposes, the laying out of farm roads, the removal of rocks, stumps and old stone walls, the construction of drains and ditches, the building of new fences and suitable housing quarters for a flock of 100 sheep. More than a mile of farm roads have been constructed which not only aid in the improvement of the farm but add greatly to the convenience of conducting field tests. Many of the old stone walls which divided the farm into small, irregular shaped fields have been removed and where possible, used in the construction of the roads. The size and shape of most of the fields have been altered so that a definite system of rotation can be followed, and in this

rearrangement much of the rough stony land formerly contained in fields has been thrown into pastures. Many of the open ditches which divided the fields and hindered cultivation have been closed with stones or tile, and in the entire work of drainage about two miles of tile have been used.

During the past two years a separate account of permanent farm improvements has been kept which shows that from July 1, 1906 to July 1, 1907, \$1,092.04 and from July 1, 1907 to July 1, 1908, \$1,576.01, a total in the two years of \$2,668.05, was expended for this purpose. This work of improvement has just been well begun and continued funds and effort should be devoted to it in the future if the farm is to be made what a college farm ought to be.

Since it is the policy of the farm management to produce on the farm itself as much as possible of the hay and grain consumed by the live stock, and since the amount of land which is suitable for grain crops, especially field tests of them, is limited, and further because a considerable area has recently been apportioned for sheep pasturage, it is highly desirable that 20 or 30 acres additional tillable land be purchased or leased.

One of the most pressing and immediate needs of the Farm Department is a new horse barn with basement for the housing of wagons and implements. The old horse barn has stood the weather of almost countless summers and winters and is now in such a condition that repairs on it are a matter of false economy.

Another urgent need is the construction of two or three farm houses in which the farm laborers can live. At the present time one teamster lives a half mile from the college buildings and another more than three-quarters of a mile. During the past two years the farm foreman has had to live a full mile from his work. It is not for the best interests of the department to have its laborers living so far from their work for more reasons than one. In view of the fact that there are no houses in the village within a reasonable distance of the college which a farm laborer can afford to rent, it would seem like a good investment for the college to build dwellings of a modest design and reasonable cost and rent them to its workmen at a rate paying the interest on the investment.

Another need not of this department in particular, but of the whole Agricultural Department in general, is a suitable and permanent meeting place for the three agricultural societies, namely, the Agricultural Club, the Alpha Zeta fraternity and the Alpha Tau Alpha society of the two-year students. The fraternal,



social and literary spirit embodied in these organizations is of much value and importance to the students and should be encouraged in every way possible. The original plan of our agricultural building was to have the third story fitted and furnished as suitable quarters for these societies but up to the present time the work has not been done. It is estimated that about \$1,500 would be required for the purpose.

F. W. TAYLOR,

*Professor of Agronomy.*

#### Department of Zoology.

I beg to present the following report of the Department of Zoology.

INSTRUCTION.—The classes given instruction during the year 1907-'08 were as follows:—

FALL TERM.				WINTER TERM.			
	Hours.		Students.		Hours.		Students.
Zoology	1	3	16	Zool.	4	3	10
Zoology	5	4	4	Zool.	40	1	7
Zoology	11	4	1	Zool.	12	4	2
Zoology	15	4	6	Zool.	14	4	6
Geology	2	3	6	Geol. Spec.		3	3
<hr/>				<hr/>			
Courses	5	18	33	Courses	5	15	28
	(8 rec. 10 Lab.)				(7 rec. 8 Lab.)		
SPRING TERM.							
	Hours.		Students				
Zool.	3	4	10				
Zool.	13	4	2				
Zool.	8	3	5				
Zool.	14	4	6				
<hr/>							
Courses	4	15	23				
	(7 rec. 8 Lab.)						

All the instruction in general Zoology, Physiology and Geology has been given by my assistant William Morton Barrows, (M. S. Harvard) in a most efficient manner. The writer with his assistant in Entomology, now Mr. C. F. Jackson, (M. S. Ohio St. Univ.), has given the instruction in the courses in entomology and advanced courses of special students. Satisfactory work in the elementary courses is hindered by having the class usually but three times a week. Two of these periods must be devoted to laboratory work, leaving but one period a week for class work of lectures, recitations, etc. One hour a week in the classroom is insufficient to cover the subjects taught, and the in-

frequency of attendance of the class makes it difficult to hold the attention of the student and arouse his interest. It is a question whether Zoology 1 and 3, required in the Agricultural Course, might not better be made elective and then more time allowed to those electing the course.

EQUIPMENT.—When the writer assumed charge of the department four years ago the Zoological collections were scattered around on open shelves and the geological collection was packed away. It has been my policy to secure cases and repair, remount, and label all specimens worthy of preservation as fast as the meagre funds of the department would permit. About \$400 has been spent for cases, so that all the perishable specimens are in tight cases, though badly crowded. All specimens have been labelled and catalogued. The geological collection has been labelled, with each specimen in a tray and for the most part placed in a large case of drawers. Several more glass front wall cases are needed to house the collections now arranged on temporary shelving. The north-east room on the second floor of Thompson Hall, formerly occupied by the Drawing Department has been arranged as a museum room in which recitations are also held. The north-west room of the basement of Thompson Hall has been fitted as a laboratory for student work with spraying apparatus. All recitations are now held in the laboratory or in the museum room, neither of which are adapted for the purpose. In the near future a separate recitation room will be absolutely necessary.

The stereopticon is a most valuable aid in lectures, but until some arrangement can be made whereby electric power may be had more conveniently than at present, it is impracticable to make much use of it. Attention should also be called to the water supply, which is so filthy that it can be used only for cleaning purposes and often is totally unfit for photographic work, causing annoying inconvenience.

The department needs considerably more equipment by way of charts, models, and specimens, all of which will be secured as soon as funds may be made available. I would respectfully request that if possible the appropriation for the work of the department be somewhat increased over that of 1907-'08, in consideration of the decrease made necessary during the present fiscal year.

Respectfully submitted,

E. D. SANDERSON.

*Professor of Zoology and Entomology.*



### Department of Physics.

The work of the Physics Department naturally falls under two heads:—

- (a) The arrangement of studies and laboratory work to meet the needs of students who intend to become teachers of either physics or chemistry or both.
- (b) To meet the needs of students who intend to take a course in pure science, whether it be with a view of continuing such a course after graduation or as a matter of training, or as a preparation to teach either physics or mathematics, or both.

The common features of both these subdivisions are a study of mathematics beyond the requirements of any of our present courses, as well as a thorough and consecutive study of the various branches of physics.

Under Class (a),

Inorganic, organic, theoretical and analytical chemistry, as well as the subdivisions of electro-chemistry are prominent and are absolutely necessary if a student is to be fitted to engage in the electro-chemical and electro-metallurgical industries.

This class requires a thorough grounding in electrical and chemical subjects, such as theoretical electricity including both direct and alternating current phenomena, an extended course in electrical measurements and testing, and a course in generator and motor testing with practice in handling machines for power distribution.

The chemical studies include analytical, theoretical, organic and industrial. Short courses in gas analysis, assaying, metallurgy, metallurgical laboratory, mechanism and steam engineering are included.

Under applied electro chemistry the student must be made familiar with the methods of handling electrolytic processes for deposition of metals, the care and use of storage batteries, the underlying principles and the construction and use of electric furnaces for the roasting and reduction of metals.

Under Class (b),

Upon the completion of the course in general physics, the subject is approached in detail from a theoretical and experimental side, and the courses being continuous are treated from a mathematical point of view.

The experimental work of this course should cover the greater

part of three years, and should be mainly devoted to physical measurements and investigations.

The laboratory work to be covered should be arranged so that each portion should be sufficiently isolated from any other that reliable results may be attained.

To do this provision should be made for laboratories as follows:

1. Laboratory for the study of the mechanics of solids, liquids and gases.

2. Heat Laboratory. Thermometry and Calorimetry; Coefficients of Expansion and Conduction; Vapor Pressures; Heating values of coals, fuels, etc.; Temperatures of kilns, flue gases, furnaces, etc.; Metallurgical Applications of Heat to Reduction Processes for reactions, etc.; Electrical Thermometry; Heat resisting materials, etc.

3. Light Laboratory. Gas Photometry, Lenses and Lens Combinations, microscopes, etc; Spectrum Analysis,—pneumatic diffraction and interference phenomena; Photographic methods, etc. Polarization of Light; Study of Light Waves, etc.; Electro Magnetic Theory of Light.

4. Elementary Electrical and Magnetic Laboratory.\*

#### ROOMS AND OFFICES NEEDED.

1. Physical Lecture Room—seating 300.

Sliding lecture desks — from lecture preparation room. Darkened by blinds; connected to steam and air pressure supplies; current mains, etc.

2. Apparatus and Lecture Preparation Rooms—for

Mechanics

Heat

Light

Sound

Electricity and Magnetism

} 2 rooms, each  
30' by 40'

3. Physical Laboratory Rooms—

1. Mechanics, 1 room, 60' by 30'.

2. Heat, 2 rooms, each 30' by 20'.

3. Light, 2 rooms, each 30' by 20'.

4. Sound, 1 room, 30' by 20'.

5. Electricity and Magnetic Measurements, 1 room, 50' by 30'.

\*Resistance measurements, e.m.f.s. currents, polarization of cells, calibration of simple instruments for Chemical and Engineering students, electrostatic phenomena applied electro chemistry, study of accumulators, electro deposition, electric furnaces, electric discharges, radioactivity, magnetic phenomena.

These rooms should be connected to power, gas and water supplies, and have solid pillars, etc., where needed.

4. Storage Battery Room, 30' by 15'.
5. Library and Reading Rooms, 2 rooms, each 30' by 20'.
6. Photographic Room, 20' by 15'.
7. Workshop—30' by 20'.
8. Machinery Room—for small dynamos, motors, etc.

Substantial equipment of the Laboratories, Workshop, Machinery rooms, etc., is absolutely imperative in order that the work of the department may be up to the standard set by the other departments.

Respectfully submitted,

A. F. NESBIT.

#### Military Department.

I have the honor to submit the following report of the conditions and needs of the Military Department of this college, viz:—

CONDITION:—The following is from the official inspection report of Captain Peter C. Harris, General Staff, U. S. Army, dated May 25, 1908:—

"The military exercises included review, inspection, parade, company and battalion drill in close and extended order. The review and other ceremonies were well executed. The cadets march with good military step and preserve good alignment.  
\* \* \* The arms and equipments were in good condition. The uniforms, with few exceptions, were neat and in very good condition. The close order battalion drill was very good and the extended order fairly good. The improvement noted in the report of last inspection has continued throughout the year."

In the three years I have been on duty here, the student feeling has changed from antipathy to pride and interest in things military. Instead of drudgery, the great majority of students, all, in fact, of the thinking students take pleasure in military work. Interest in rifle practice is keen as shown by the fact that over 50 per cent. of the battalion have been on the rifle range to shoot outside of the prescribed drill hours, with the result, that, using the same standard of classification as the National Guard of this and other states, three (3) sharpshooters and twenty-one (21) marksmen qualified.

The present organization is field, staff, band and three companies of infantry. The course of instruction covering three years, is shaped, per letter instructions from Adjutant General's

Office dated Washington, D. C., January 25, 1908, to "*qualify students who enter the military departments to be Company officers of Infantry Volunteers or Militia.*"

During my term of duty, drill hour has been changed from 4 p. m., (students' recreation hour) to 11 a. m.; credit given towards diploma for work done in this department; a band organized, silk National colors purchased and college dues remitted for Seniors who elect to drill as cadet officers.

NEEDS:—

1. College, instead of individual students, should purchase instruments for band.
2. Appropriation for this department should be increased to \$200 annually.
3. Battalion colors to go with National Colors.
4. Flagstaff, halyards and flag for armory.
5. Necessary State legislation so that work in Military Department evidenced by diploma of college and recommendation of the Commandant be recognized by the National Guard of New Hampshire, e. g., commission as captain for term (five) years or until removal from State.
6. Provision for limited number of cadet officers to be assigned to staff departments N. H. N. G. during annual encampment at Concord, N. H.
7. An annual camp of at least one week in early fall.
8. A scholarship offered to one member of each company of the National Guard, such student to retain his membership in National Guard while in college.

Respectfully,

WM. E. HUNT,

*Captain 22nd U. S. Infantry.*

*Professor of Military Science and Tactics.*

#### Department of Modern Languages.

I beg leave to submit the following report with regard to the condition and needs of the Modern Language Department.

The total number of students taking French, German, and Spanish is 156. The head of the department has 18 recitations per week, and Mr. Spencer, his assistant, has 9 recitations in French, German and Spanish in addition to 9 recitations in English.

It is advisable to have 4 divisions instead of 2 in Freshman German, for at present we have 43 in one division and 30 in the other.

There is a demand for a fourth year in French and German literature and another year in composition. The head of the department has met this demand in a measure in previous years, but the members in the lower classes are becoming so large, that more assistance will be needed in the immediate future.

I recommend, therefore, that an assistant be employed who will give his full time to this department.

Yours very truly,

RICHARD WHORISKEY,  
*Professor of Modern Languages.*

#### Department of Drawing and Design.

Since the last biennial report was issued, the Drawing Department has moved from the room on the second floor of Thompson Hall to the first floor of the same building, so that, at present, there is ample room for classes now taking Drawing and Machine Design, and extra room enough to accommodate a considerable increase in the number of students.

The drawing tables and stands used for Freshman Drawing are sufficient in number for classes not larger than the present Freshman class. These should be replaced, however, by 50 substantial tables which should be fitted with drawers for drawing supplies, and bolted to the floor.

The equipment in the Senior Drawing room should be improved also, and increased so as to accommodate 40 students.

The department has at present, 3 cases for drawing boards and student supplies, each with 15 lockers. Three additional cases are greatly needed, one for the Senior and Junior room and two for the Freshman room, all to be fitted for master keys.

The department has a good collection of models for *free hand drawing*, but greatly needs additional models for machine drafting and a horizontal type of engine, cut in section, for valve design.

A catalog case, for holding and filing of trade catalogs and a blue print filing case are also much needed.

Respectfully submitted,

F. W. PUTNAM,  
*Professor of Drawing and Design.*

#### Department of Botany.

The department has recently increased its equipment by the addition of a few tables and microscopes. Its supply in each of these lines needs to be doubled in order to satisfactorily accommodate the present number of students. It is greatly in need of a



stereopticon for lecture and laboratory purposes. One of its most urgent wants is a small greenhouse in which laboratory material may be grown and kept. It has a satisfactory lecture room but needs more laboratory space.

CHARLES BROOKS,  
*Professor of Botany.*

#### Department of Electrical Engineering.

I beg to report in regard to the condition and needs of my department.

In the first place, we have a very strong course in Electrical Engineering, one that will compare favorably with some of our best technical institutions, as far as the text books and lecture work are concerned; but we are poorly provided with instruments, machines, and the general equipment, essential for carrying on efficient laboratory work. This branch of an Electrical Engineering course is of very great importance and such a course cannot be completed without it.

Our greatest needs are better facilities, more room, more apparatus and above all a new Engineering Building.

We are now greatly handicapped for want of lecture room space. We are obliged to hold classes in laboratory rooms where there is only small blackboard space and no seating accommodations except ordinary chairs.

The present indications point to the fact that the largest per cent. of students entering this college choose the engineering courses and if the numbers increase each year as they have during the past few years, it will not be long when it will be practically impossible to care for them in my department with present facilities.

I would urge very strongly that steps be taken at the earliest possible moment for the providing of funds necessary to erect a suitable building to meet the urgent requirements of the Engineering Departments.

Respectfully submitted,

C. E. HEWITT,  
*Professor Electrical Engineering.*

#### Department of Horticulture.

I have the honor to present herewith my first annual report as professor of Horticulture and Forestry. My duties commenced on July 1, and I have, therefore, but a brief account to give of the work of the department from that date to October 1. For

convenience I have divided this report into subheadings as follows: Care of Roads and Grounds; Forestry; Instruction; Needs of the Department.

#### CARE OF ROADS AND GROUNDS.

The grounds have been kept in good condition throughout the season so far as mowing the grass and ordinary care are concerned. The very dry weather and clouds of dust throughout the months of June and July left the lawns very brown and dry and the trees very dirty in appearance. Later rains improved the condition to such an extent that the campus presented a very handsome appearance throughout the months of August and September.

The condition of the roads is not first-class. The drives leading to Thompson Hall are in need of regravelling and stone gutters should be laid along the sides to prevent washing. All roads have been kept free from weeds. A new crossing was constructed over the B. & M. track on the service drive near the power house.

The largest single piece of work done on the campus this fall was the grading of the grounds about the woman's dormitory, or Smith Hall. This work was completed, so far as present funds will allow, before the opening of college and has been inspected by the Board of Trustees.

No extensive planting was done on the grounds this year. Two flower beds were planted near the greenhouses and near Morrill Hall and next year a third will be planted in front of Smith Hall. All other planting will be confined to shrubs and trees, as it is believed that such plants are more in keeping with the dignity of the buildings and the extent of the grounds, and moreover they are much less costly to maintain.

#### FORESTRY.

No work has been done in the college forest during the past few months. I found a large quantity of lumber on hand when I took charge of the department. Small quantities have been sold locally from time to time and the sales duly turned in to the business office. It is proposed to dispose of this lumber in bulk to a commercial lumber company late this fall or early this winter, retaining only sufficient to supply the college needs.

#### INSTRUCTION.

Courses in horticulture are given throughout the four years of the agricultural course. The courses with students enrolled at the present time are as follows:



Principles of Horticulture, for Freshmen in 4 year course, 16 students.

Special in Pomology, for Seniors, 4 students.

Pomology and Viticulture, for Juniors in 4 year course, 4 students.

Landscape Gardening, for Seniors, 2 students.

Special in Floriculture, for Seniors, 1 student.

Special in Forestry (study of native trees) 2 students.

Plant Growth and greenhouses, for 2nd year, 2 year course, 7 students.

Plant Growth and greenhouse for 2nd year, 2 year course, 8 students.

Vegetable Gardening, for 1st year, 2 year course, 15 students.

The total number of hours' instruction given per week by the department at the present time amounts to fifty-four.

#### NEEDS OF THE DEPARTMENT.

##### *Experiment Station Work.*

The character of the land now under control of the Horticultural Department is detrimental to good experimental work. The land is too scattered in location, is uneven in quality, and so stony as to need expensive clearing of rocks to fit it for good work. After a careful study of the soil conditions on the college farm, I am, however, convinced that the land allotted to the Horticultural Department so far as it goes, can be made fairly satisfactory for experimental work by the expenditure of a reasonable sum of money for clearing it of rock, manuring it and fencing it. I recommend, therefore, that an appropriation of not less than \$600 be made for the purpose of clearing rocks from the orchards and garden soils and for the fencing of the college or Thompson orchard.

It is imperative in the pomological branch of the work of the Horticultural Department that a small fruit plantation be started at the earliest possible date consistent with the proper choice of location and preparation of the soil.

A further matter demanding pressing attention is the construction of a proper packing and storage house for fruits and vegetables. One of the important factors in the business of fruit and vegetable marketing at the present time is cold or cool storage, and it is not only desirable but necessary that the Horticultural Department lead in demonstrating the practicability of cold storage of fruits and vegetables for New Hampshire condition. A second factor of equal importance is the proper packing for market of horticultural products; and a building of inex-

pensive but permanent character combining these two features is an absolute necessity. A building of this character erected in 1901, of which the writer knows all particulars, cost the sum of \$3,430.40. The cost of building is somewhat greater now and the sum of \$4,000 is asked for to cover all expenses. About \$2,000 of this would return to the college for the purchase of lumber, making the actual cash outlay about \$2,000 for the work, a very cheap investment and one that will result in a saving of several hundred dollars every year by storage of fruits and vegetables that would otherwise be lost. The head of the Department of Horticulture is willing to undertake to build this storage house from sales from the Forestry Department and to make only judicious cuttings from the college forest in doing so.

#### *Roads and Grounds.*

So much could be done to beautify and improve the conditions of the roads and grounds that I am at a loss to state which conditions are in most pressing need of attention. I should, however, recommend two things for immediate action.

First—The construction of cement sidewalks leading to and from the principal buildings, and extending along the main road from a point opposite Nesmith Hall to the inside of the southeast drive leading to the Library. An estimate of the cost of the walks to be laid the first year, amounting to \$1,000, has already been submitted for your consideration.

Second—There is immediate need for the planting of a large number of trees. The grounds about Thompson Hall, the Library and Smith Hall are in need of planting. This work should not be delayed. Every year is precious in the growth of a tree. The amount needed for this work is \$200.

#### *Maintenance.*

The grounds cannot be maintained for less than \$1,200 next year. In addition to the ordinary running expenses which we had to meet this year, the needs of this work require the purchase of a two horse farm wagon for transportation of gravel, manures, hay, etc., and also a new horse lawn-mower. Moreover we have the additional care of the grounds at Smith Hall.

#### *Grading.*

Neither the grading about Smith Hall nor at the Library has been completed. I am not prepared to say what either will cost. To complete the grading at Smith Hall and make it level with the road in front will cost \$1,400. I recommend however, that the ground there be left nearly in its present con-

dition but that enough money be appropriated to finish the grading at the back and sides of the building, to properly drain the front lawn, and to smooth off the boulders which are in the central part of the lawn. The ledges at the sides can be used to advantage as landscape features by judicious planting. The cost of completing the grading in this manner will be in the neighborhood of \$450.

*Changes and additions to staff.*

Two changes of immediate importance are necessary.

Mr. Lumsden, the general foreman, is too heavily burdened with conflicting duties to perform efficient service. I wish him to confine himself strictly to the work of the greenhouses, outdoor floriculture, and a general supervision of the roads and grounds. It will be necessary then to appoint a foreman who will have immediate and personal supervision of the labor, the sales of garden truck, lumber, etc., at \$60 per month. *This change is imperative.* More than the foreman's salary will be saved in added efficiency of the labor force as a result of personal supervision and undivided attention.

An assistant in Vegetable Gardening should be added to the staff of the department as early as possible next spring. This assistant will give the lectures on this subject and take charge of the work in the vegetable gardens, the principal line of work as indicated being investigations on the breeding of tomatoes and squashes.

I further recommend that a first class instructor in forestry be added to the staff either of this department or as head of a separate department. There are at this time at least four students enrolled who purpose taking full courses in forestry and with the present equipment of the teaching staff it is impossible to outline complete courses in this subject and inquiries for such a course are numerous. The importance of this action on the part of the college needs no further statement. Forestry in New Hampshire is a matter of vital importance. The call comes from the people and should be heeded at once if the college is to perform the most efficient service for the state.

It is with great pleasure that I speak of the cheerful and efficient service rendered by Mr. W. H. Wicks, the newly appointed assistant in Horticulture and by Mr. David Lumsden, foreman of gardens and greenhouse. Both men have given unselfish attention to their work and have done all in their power to advance the interests of the department.

I would call attention especially to Mr. Wicks' work in con-

nection with the exhibits made by this department at the State Fair and at the fair at Rochester. The demonstration in apple packing and pruning made at these fairs reached many of the farmers in a personal way. Mr. Wicks' work was also responsible for the success which attended the apple packing experiments in the town of Deerfield. Mr. Wicks gives the instruction in all branches of Pomology in the college courses.

Mr. Lumsden, in addition to his duties as foreman and florist, has found time to grow vegetables in two of the greenhouses, make many self and cross-fertilizations on cucumbers, muskmelons, and tomatoes, and to conduct the class work in floriculture and landscape gardening.

B. S. PICKETT,

*Professor of Horticulture and Forestry.*

#### Department of English and Philosophy.

##### ENGLISH.

The college has recognized the great need of training its students in the writing of forceful, correct English. The emphasis that has been placed upon practice has been justified by the results. There has been a gradual improvement in the writing of the students, and the work of the first year has been made more interesting. The courses offered are now thoroughly organized and closely related. Of additional advanced courses there is great need. The enrichment of the General Course especially demands an increase in the number of such English courses, but, with the present teaching force, such an increase is impossible.

##### PHILOSOPHY.

The value of the study of philosophy in a scientific institution has often been emphasized by leading educators. At New Hampshire College the courses in philosophy have always been popular, even though the demands of professional preparation have made it impossible for some students to elect the work in philosophy in which they were naturally interested. The demand for courses in pedagogy, however, has forced the department to decrease those offered in philosophy, and, at the present time, only two purely philosophic courses are given during the college year.

The work in pedagogy has grown in importance until its value to the student who plans to teach is no longer debated. The courses in pedagogy attempt to help the student enter upon his teaching in the high school or college with facility and sympathetic understanding.

At present the instructor in pedagogy has to divide his time between the work of this department and English. The proper development of these courses demands the entire time of one instructor.

E. R. GROVES.

*Professor of English and Philosophy.*

#### **Mechanical Engineering Department.**

I have the honor to report as follows in regard to the condition and needs of the Mechanical Engineering Department.

The Department of Mechanical Engineering is responsible for the larger part of the professional instruction given to all students in Mechanical and Electrical Engineering, as well as for some of the instruction given to Chemical and Agricultural students. Since fully 45 per cent. of our student body are studying Mechanical and Electrical Engineering, it follows that the usefulness of this college to the State of New Hampshire depends in a very large measure on the degree of thoroughness and excellence of the instruction imparted by the Mechanical Engineering Department.

The State of New Hampshire is essentially a manufacturing community. Her continued prosperity depends more upon the wise and efficient direction of the efforts of her population in manufacturing lines, than upon any other factor. The education of some of her young men as engineers is therefore essential to the welfare of the state, for otherwise her industries will lack for proper direction, and suffer as a consequence.

It therefore follows that it is the duty of the state not only to provide the means for obtaining such education, but to foster such schools as carefully, and deal with them as generously as any other schools forming a part of her educational system.

The value of these men to the industries of the state will depend upon the excellence of the professional training which we are able to give them. In the case of an engineering school, the excellence attained depends first upon a right order of studies and a proper apportionment of time among the several subjects, second upon good teaching of these subjects, and third upon proper and adequate class room and laboratory facilities.

Professor Hewitt, the head of the Electrical Engineering Department, and myself are preparing a schedule of studies for the Mechanical Engineering and Electrical Engineering courses, introducing some changes both in the subject matter and in the order of our present courses, with the object in mind of improving in the highest degree possible by that means, the



efficiency of the work. These changes, if made, cannot be fully brought about before the year 1912-13, but it will be possible by this means alone to make steady improvements in our work in the meanwhile.

The grade of teaching done will depend not only upon the professional and teaching ability of the instructor concerned, but also upon the amount of work which he has to do. The greater the number of subjects he is called upon to teach, the less the time he can devote to the preparation of his work, and the poorer will be the quality of his instruction. The amount of instruction given by the Mechanical Engineering Department is such that it is impossible to devote adequate time to the preparation of the work, and the instruction is therefore not as efficient as it should be. This defect can be remedied by more assistance, and until it is so remedied, our work must suffer.

In the matter of class room and laboratory facilities, the college is very deficient. Our mechanical laboratory is poorly equipped, and lacks instruments and apparatus of all kinds. Not only do we need more apparatus, but we need more room for the apparatus we have. We also need a mechanician who will devote his time to the building and repair of laboratory apparatus. Such a man is a part of the regular staff of every first-class technical school, while many of the larger schools have four or five such men.

Our shops, like our laboratory, are lacking in equipment, and are very much over crowded. Many of our tools are so poor as to be useless for purposes of instruction. In many of our sections, we have more men working than we have tools upon which they can work, and if new tools were secured, there would not be floor space for them. Both our foundry and blacksmith shop are lacking in equipment necessary to make their work of real value to Engineering Students, the foundry more especially, and there is not sufficient room to add this equipment, if it were built or purchased.

In every sub-division of the Mechanical Engineering Department, we feel the hampering effects of this lack of room and equipment. We need a reading room and a place for a department library. Our locker rooms are inadequate. The same is true of our tool rooms. We have no proper lecture or demonstration rooms, and our only recitation room is at a distance from our offices and apparatus. Our difficulties can only be met by the erection of a suitable engineering building.

In summarizing, I would say, that considering our facilities,

our condition is good, and will be bettered as fast as is possible. Our needs are, first, a new engineering building, second, more and better shop and laboratory equipment, and third, additional assistance for our instructing staff. Unless we get these things we must be content to be a second class institution of questionable utility to the state.

In addition to his duties as Professor of Mechanical Engineering, the writer also has the supervision of the Power and Service Department, and of the Buildings and Repairs Department. There are certain matters in connection with the work of these departments to which I wish to call your attention.

The first of these is the necessity of supplying potable water to the different college buildings. Our present water supply while excellent for the use of our boiler plant, is unfit to drink, and often of such disgusting odor as to make its use even for sanitary purposes, unpleasant. An adequate supply can be obtained more cheaply from drilled wells than in any other way. I am unable to state at present the number and cost of the wells necessary to produce the required supply, but am giving the matter my earnest attention.

The second matter is the necessity of outside painting for several of the buildings, the wood work being in some cases unprotected from the elements. The cost of this work I am informed would be about \$500.

A third matter is in connection with the need of the college for an electric generator of larger capacity. The present generator is likely to burn out on account of the overload at any time. A 50 K. W. unit, in the form of a steam turbine driven alternator could be installed at a cost of about \$2,500. This unit should be so connected that the exhaust steam could be used for heating the college buildings, instead of live steam directly from the boilers, thus enabling us to furnish our light and power without cost, at such times as we need steam for heating.

At other times, it is the writer's opinion that it would be cheaper to buy our power, rather than run the power plant. This is especially true, since the demand for power during the months that we are not heating is comparatively light, and the cost per K. W. of producing the power is relatively higher. Such an arrangement would be of great advantage to some of the other departments which are now handicapped through the lack of a continuous source of power. The cost of the apparatus necessary to utilize electric instead of steam power, would be about \$2,000 to \$2,500. The saving which could be affected by



these changes would be at least \$750 per year, an amount sufficient to warrant the making of them, without any question.

FORREST E. CARDULLO,

*Professor of Mechanical Engineering.*

#### **Department of Dairying.**

I submit herewith the following report on the present condition and needs of the Dairy Department.

As the College Creamery was built before the subject of dairying was taught in a systematic way in colleges and at a time when the number of students taking dairy work was comparatively few, it was planned and constructed more as a commercial buttermaking plant than a place suitable for giving instruction to the dairy student. With the constant increase in the agricultural students the building as far as room and arrangement are concerned has been for several years entirely inadequate to fulfill the needs of the Dairy Department.

Aside from the inadequacy regarding room and equipment, the construction and the present condition of the building from a sanitary standpoint does not measure up to the requirements of the present day. The public health authorities and the dairy educators have, during recent years, given increased attention to the relation of milk and other dairy products to public health. The ideals of cleanliness and sanitation have greatly changed. Due to the continual use of water day after day for years the frame work of the building and the floors have gradually softened and are now rapidly decaying not only making the building very faulty from a sanitary standpoint but the safety of the building is also at present a point for serious consideration.

Considering the unsanitary condition of the building and its inadequacy for giving efficient instruction to the present number of students, the greatest need of the Dairy Department is a new Dairy Building. The need has been felt for several years, but each year it becomes more urgent.

At present there is no dairy class room, the classes being conducted in the agricultural building wherever room is available. Additional instructors have been added to the teaching force in the Horticultural, Animal Husbandry and Agronomy Departments. New courses of study have been introduced in these departments and it has been exceedingly difficult of late for the classes in Dairying to obtain a class room for lectures and recitations.

The topography of the country, the climate, the fact that a large portion of the soil is depleted of its fertility and the steady

increasing demand for dairy products, will always make dairying preeminent in New Hampshire agriculture. The dairy industry in the state is quite diversified. It includes the production and handling of milk for city supply, factory and farm buttermaking, factory and farm cheese making, the condensing of milk and the making of ice cream. In planning and erecting a dairy building the one thought never to be lost sight of is to build to suit the needs of the dairy industry in New Hampshire and the needs of the Agricultural College.

To fill these needs such a building should contain suitable laboratories equipped for teaching the following subjects: Handling of milk for city supply; farm buttermaking; cheese making, milk testing and milk inspection; ice cream making, dairy bacteriology and creamery buttermaking. In addition, the building should contain offices, class rooms, and a reading room.

The Federal Government appropriates over \$25,000 this year for experimental and research work in Agriculture. The dairy industry of New Hampshire warrants that a fair share of this be used for work along dairy lines. To make this work efficient the building should be equipped with a suitable cold storage system, for to be able to perfectly control temperature is one of the very essential factors in experimental work whether it be directed along the lines of the manufacture of cheese and butter or along bacteriological lines. Dairy bacteriology and dairy chemistry are becoming more and more important in experimental and research work and without suitable room and equipment for such work the building would not be complete.

FRED RASMUSSEN,

*Associate Professor of Dairying.*

#### **Department of Animal Husbandry.**

The Department of Animal Husbandry is better equipped in some respects for teaching its subjects than a year ago. Within the past few months the volumes of the following Herd Books and Flock Books have been brought up to date:

1. American Short-Horn Herd Book.
2. American South Down Record.
3. Herd Register of the American Jersey Cattle Club.
4. Holstein-Friesian Herd Book.
5. American Berkshire Record.
6. Herd Register of the American Guernsey Cattle Club.
7. Continental Dorset Club Record.

In the class room additions have been made in the way of

maps, photographs and tables which greatly facilitate the work.

The condition of the college herd is worthy of note from the standpoint of increase and future growth. At the present time the milking herd consists of thirteen aged cows and two 3 year old heifers. By January 1, 1909 the milking herd will number seventeen head. During 1909, five heifers will freshen bringing the number to twenty-two. These heifers will take the place of some of the older cows which will necessarily be culled out during the next two years. In order to keep the numbers of the herd up to the point where it ought to be and to have representative types for judging work, six animals of the following breeds ought to be added:

2 Holsteins.

3 Guernseys.

1 Ayrshire.

The present herd of hogs, while about thirty-five in number of common breeding, have practically no winter quarters. Before a representative herd of hogs can be maintained a suitable piggery must be constructed.

W. H. PEW,

*Associate Professor of Animal Husbandry.*

### Library.

I beg to submit the following statement of the present condition of the library.

The library of the college contains about fourteen thousand bound volumes and over seven thousand pamphlets. The books have been selected with reference to the instruction given in the college and include, therefore, the more technical and specialized working collections for the different scientific departments as well as a reference library of broader scope covering economic science and literature.

The new library building gives shelf room for at least sixty-five thousand volumes; and its reading room is well supplied with the best scientific and general periodicals. By the arrangement which brings the town and college libraries into the same building, the town collection of nine thousand well chosen volumes is easily available for the use of the college.

MABEL HODGKINS,

*Librarian.*

## PRESIDENT'S GOVERNMENT REPORT.

*Name of Institution, NEW HAMPSHIRE COLLEGE OF AGRICULTURE  
AND THE MECHANIC ARTS.*

*Post-office, DURHAM; State, NEW HAMPSHIRE.*

Report of the President of said institution to the Secretary of the Interior and the Secretary of Agriculture, as required by act of Congress of August 30, 1890, in aid of Colleges of Agriculture and the Mechanic Arts.

**I. Condition and Progress of the Institution for the Year Ending, June 30, 1907, Especially—**

(1) Changes in courses or methods of instruction if of sufficient importance to warrant mention, and (2) purpose, structural character, and cost of new buildings or additions to buildings.

The new library building was dedicated June 3rd, 1907. It was erected at a cost of \$32,888 of which amount \$20,000 was furnished by Andrew Carnegie and \$12,888 by the Hamilton Smith estate. The building is of red pressed brick with Indiana limestone trimmings and slate roof. It has ample reading and reference rooms, also seminar and study rooms and a large historical collection room besides librarian's office, catalog room, and a three-story stack room with a capacity of 60,000 volumes. In this building will be consolidated the libraries of the college, the Durham Library Association and the Durham Public Library. The consolidated library will also receive the benefit of the invested funds of the Durham Library Association amounting to about \$11,000. The library will be maintained by the college for the free use of faculty, students, members of the Durham Library Association and citizens of Durham.

**II. Value of Additions to Equipment During the Year Ending June 30, 1907.**

(b) Buildings .....	\$32,000.00
(c) Library .....	2,000.00
(d) Apparatus .....	2,000.00
(e) Machinery .....	215.00
(f) Live Stock .....	837.64
<hr/>	
Total .....	\$37,052.64

## III. Receipts for and During the Year Ending June 30, 1907.

1. State aid:	
(c) Appropriation for current expenses.....	\$13,000.00
2. Federal aid:	
(a) Income from land grant, act of July 2, 1862	4,800.00
(c) Additional endowment act of August 30, 1890	25,000.00
3. Income from endowment other than Federal or State grants .....	3,252.00
4. Fees and all other sources:	
(a) Tuition fees .....	3,603.50
(b) Incidental fees .....	2,012.42
(c) Miscellaneous receipts .....	36,760.79
(d) Andrew Carnegie—library.....	20,000.00
(e) Hamilton Smith Estate—library .....	12,888.00
5. Total .....	\$121,316.71
6. Federal appropriation for experiment stations....	22,000.00

## IV. Property, Year Ending June 30, 1907.

Value of buildings, \$268,000; of farm and grounds, \$20,500; of apparatus, \$28,000; of machinery, \$6,800; of library, \$15,000; of live stock, \$4,500; of other equipment, \$16,000.

Total number of acres in farm and grounds, 343; acres under cultivation, 100.

Amount of land-grant fund of July 2, 1862, \$80,000; amount of other endowment funds, \$70,000.

Number of bound volumes in library, June 30, 1907, 13,476; pamphlets, 3,800..

## V. Professors and Instructors During the Year Ending June 30, 1907.

1. College of Agriculture and Mechanic Arts:	
	Male.
(b) Collegiate and special classes.....	26
(c) Total, counting none twice.....	26
2. Number of staff of experiment station.....	11

**VI. Students During the Year Ending June 30, 1907.****1. College of Agriculture and Mechanic Arts:**

	Male.	Female.
(b) Collegiate classes (including special students in college classes)	154	11
(c) Post-graduate courses .....	1	
(d) Short or special Courses.....	39	3
Total, counting none twice.....	194	14

3. Number of college students in regular four year agricultural course, 13; mechanical engineering course, 23; electrical engineering course, 24; chemical engineering course, 13; general science course 13; 70 freshmen unclassified.

4. Number of students in short and special courses in agriculture, 31; dairying, 13.

6. Number of students in military drill, 170.

7. How many students graduated from undergraduate college courses during year ending June 30, 1907? Men, 12; women, 2. Ten from two year course in agriculture.

8. Average age of students graduated from undergraduate college courses during year ending June 30, 1907, 22½.

9. What degrees and how many of each kind were conferred during year ending June 30, 1907? On men, 12 B. S., 1 M. S. On women, 2 B. S.

10. What and how many honorary degrees were conferred during year ending June 30, 1907? None.

(Signed) W. D. GIBBS, *President*.

Date, August 7, 1907.

**PRESIDENT'S GOVERNMENT REPORT.**

*Name of Institution*, NEW HAMPSHIRE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS.

*Post-office*, DURHAM; *State*, NEW HAMPSHIRE.

Report of the President of said institution to the Secretary of the Interior and the Secretary of Agriculture, as required by act of Congress of August 30, 1890, in aid of Colleges of Agriculture and the Mechanic Arts.

**1. Condition and Progress of the Institution for the Year Ending June 30, 1908, Especially—**

(1) Changes in courses or methods of instruction if of sufficient importance to warrant mention, and (2) purpose, structural



character, and cost of new buildings or additions to buildings.

(1) The three term plan of instruction changed to the two semester plan. (2) A new building for women—Smith Hall—has been erected at a cost, including equipment, of \$28,500. The structure is brick, three stories and basement, slate roof, and will accommodate 40 girls. The funds were procured as follows:—

\$16,000 Mrs. Sherly Onderdonk, Durham, N. H.

10,000 State appropriation.

2,500 State appropriation.

Building to be occupied Sept., 1908.

## II. Value of Additions to Equipment During the Year Ending June 30, 1908.

(a) Permanent endowment .....	\$300.00
(b) Buildings, Smith Hall for women (almost completed) .....	28,500.00
(c) Library, 11,061 vol. pamphlets.....	10,187.00
(d) Apparatus .....	2,000.00
(e) Machinery .....	450.00
(f) Live stock (not including experiment station purchases) .....	218.00
(g) Miscellaneous .....	500.00
Total .....	<hr/> \$42,155.00

## III. Receipts for and During the Year Ending June 30, 1908.

### 1. State aid:

(c) Appropriation for current expenses.....	\$13,000.00
(e) Appropriations for buildings or for other special purposes .....	34,000.00

### 2. Federal aid:

(a) Income from land grant, act of July 2, 1862 (State Bonds) .....	4,800.00
(c) Additional endowment acts of August 30, 1890, and March 4, 1907.....	30,000.00

### 3. Income from endowment other than Federal or State grants .....

3,292.00

### 4. Fees and all other sources:

(a) Tuition fees .....	3,696.00
(b) Incidental fees .....	1,994.46
(c) Miscellaneous receipts .....	64,665.04

5. Total .....	<hr/> \$155,447.50
6. Federal appropriation for experiment stations....	24,000.00



**IV. Property, Year Ending June 30, 1908.**

Value of buildings, \$332,000; of farm and grounds, \$30,000; of apparatus, \$30,000; of machinery, \$10,000; of library, \$25,000; of live stock, \$4,374; of other equipment, \$20,000.

Total number of acres in farm and grounds, 345; acres under cultivation, 100.

Amount of land-grant fund of July 2, 1862, \$80,000; amount of other endowment funds, \$70,000.

Number of bound volumes in library, June 30, 1908, 23,563; pamphlets, 4,500.

**V. Professors and Instructors During the Year Ending June 30, 1908.**

1. College of Agriculture and Mechanic Arts:	
(b) Collegiate and special classes.....	31
(c) Total, counting none twice .....	31
2. Number in all other departments ( <i>avoid duplication</i> ) .....	31
3. Number of staff of experiment station.....	11

**VI. Students During the Year Ending June 30, 1908.**

1. College of Agriculture and Mechanic Arts:	Male.	Female.
(b) Collegiate classes (including special students in college courses)	166	15
(d) Short or special courses.....	22	
Total, counting none twice.....	188	15

‡3. Number of college students in regular four year agricultural course, 50; mechanical engineering course, 17; electrical engineering course, 18; chemical engineering course, 19; and \*general engineering course (including engineering students not yet classified by courses), 28; general science course, 11.

4. Number of students in short and special courses in agriculture, 15; dairying, 7.

7. Number of students in military drill, 154.

8. How many students graduated from undergraduate college courses during year ending June 30, 1908? Men, 27; women, 3.

9. Average age of students graduated from undergraduate college courses during year ending June 30, 1908, about 22½.

\*Sophomore engineers unclassified.

‡All freshmen unclassified as to courses.

10. What degrees and how many of each kind were conferred during year ending June 30, 1908? On men, 27 B. S. On women, 3 B. S.

11. What and how many honorary degrees were conferred during year ending June 30, 1908? None.

(Signed) W. D. GIBBS, *President*.

Date, Sept. 1, 1908.

### TREASURER'S GOVERNMENT REPORT.

*Name of Institution*, NEW HAMPSHIRE COLLEGE OF AGRICULTURE  
AND THE MECHANIC ARTS.

*Post-office*, DURHAM; *State*, NEW HAMPSHIRE.

Report of treasurer of said institution to the Secretary of Agriculture and the Secretary of the Interior, of amount received under act of Congress of August 30, 1890, in aid of Colleges of Agriculture and the Mechanic Arts, and of the disbursements thereof, to and including June 30, 1907.

#### Receipts.

Received from the United States government..... \$25,000.00

#### Disbursements.

Disbursed for instruction and facilities:

In agriculture, as per schedule A.....	\$4,381.26
In mechanic arts, as per schedule B.....	8,304.49
In English language, as per schedule C.....	1,126.02
In mathematical science, as per schedule D.....	2,158.42
In natural or physical science, as per schedule E...	7,517.15
In economic science, as per schedule F.....	1,512.66

Total .....	\$25,000.00
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I hereby certify that the above account is correct and true, and, together with the schedules hereunto attached, truly represents the details of expenditures for the period and by the institution named; that said expenditures were applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction,

and that no part of these funds was expended for the erection, preservation, or repair of any building or buildings.

(Signed)

WALTER M. PARKER, *Treasurer.*

**SCHEDULE A.**—*Disbursements for instruction in Agriculture, and for facilities for such instruction, during the year ended June 30, 1907.*

I. For instruction, viz:

For the salaries of (1) Professor of Agriculture,	
\$800.00; (2) Professor of Agricultural Chemistry,	
\$400.00; (3) Assistant Professor of Agriculture,	
\$550.01; (4) Professor of Horticulture and Forestry	
\$761.91; (5) Instructors in Horticulture, \$178.37;	
(6) Instructors in Dairying, \$522.80 .....	\$3,213.09

II. For facilities, as follows:

For apparatus, stock and materials .....	1,096.33
For text-books and reference books .....	71.84
	<hr/>
Total .....	\$4,381.26

**SCHEDULE B.**—*Disbursements for instruction in Mechanic Arts and for facilities for such instruction, during the year ended June 30, 1907.*

I. For instruction, viz.:

For the salaries of (1) Professor of Mechanical En-	
gineering, \$2,000.00; (2) Assistant Professor of	
Mechanical Engineering, \$925.50; (3) Instructors in	
Machine work, \$1,059.99; (4) Professor of Electric-	
al Engineering, \$900.00; (5) Instructor in Electric-	
al Engineering, \$459.96; (6) Associate Professor	
of Drawing and Design, \$1,299.99 .....	\$6,645.44

II. For facilities, as follows:

For apparatus, stock and materials .....	1,495.10
For text-books and reference books .....	163.95
	<hr/>
Total .....	\$8,304.49

**SCHEDULE C.—Disbursements for instruction in English Language, and for facilities for such instruction, during the year ended June 30, 1907.**

I. For instruction, viz:	
For salaries of Instructors in English Language ....	\$918.36
II. For facilities, as follows:	
For text-books and reference books .....	207.66
Total .....	\$1,126.02

**SCHEDULE D.—Disbursements for instruction in Mathematical Science, and for facilities for such instruction, during the year ended June 30, 1907.**

I. For instruction, viz:	
For the salary of the Professor of Mathematics ....	\$2,131.27
II. For facilities, as follows:	
For apparatus, stock and materials .....	27.15
Total .....	\$2,158.42

**SCHEDULE E.—Disbursements for instruction in Natural or Physical Science and for facilities for such instruction during the year ended June 30, 1907.**

I. For instruction, viz:	
For the salaries of (1) Professor of Chemistry, \$2,416.62; (2) Instructors in Chemistry, \$1,200.00; (3) Professor of Physics, \$900.00; (4) Instructors in Physics, \$459.96; (5) Associate Professor of Botany, \$300.00; (6) Professor of Zoology and Entomology, \$800.00; (7) Assistant Professor of Zoology and Entomology, \$100.00 .....	\$6,176.58
II. For facilities, as follows:	
For apparatus, stock and materials .....	366.39
For text-books and reference books .....	974.18
Total .....	\$7,517.15

**SCHEDULE F.—Disbursements for instruction in Economic Science, and for facilities for such instruction, during the year ended June 30, 1907.**

I. For instruction, viz:	
For Professor of Economic Science .....	\$1,400.00
II. For facilities, as follows:	
For text-books and reference books .....	112.66
Total .....	\$1,512.66

## TREASURER'S GOVERNMENT REPORT.

*Name of Institution,* NEW HAMPSHIRE COLLEGE OF AGRICULTURE  
AND THE MECHANIC ARTS.

*Post-office,* DURHAM, State. NEW HAMPSHIRE.

Report of treasurer of said institution to the Secretary of the interior and the Secretary of Agriculture, of amount received under act of Congress of August 30, 1890, and March 4, 1907, in aid of Colleges of Agriculture and the Mechanic Arts, and of the disbursements thereof, to and including June 30, 1908.

## Receipts.

Received from the United States government. .... \$30,000.00

## Disbursements.

Disbursed for instruction and facilities:

In agriculture, as per schedule A. ....	\$4,482.78
In mechanic arts, as per schedule B. ....	10,039.71
In English language, as per schedule C. ....	1,534.81
In mathematical science, as per schedule D. ....	2,544.61
In natural or physical science, as per schedule E. ....	9,931.23
In economic science, as per schedule F. ....	1,466.86

Total expended during year ..... \$30,000.00

I hereby certify that the above account is correct and true, and together with the schedules hereunto attached, truly represents the details of expenditures for the period and by the institution named; that said expenditures were applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life, to the special preparation of instructors for teaching the elements of agriculture and the mechanic arts, and to the facilities for such instruction; and that no part of these funds were expended for the erection, preservation, or repair of any building or buildings.

(Signed) WALTER M. PARKER, *Treasurer.*

**SCHEDULE A.**—*Disbursements for instruction in Agriculture, and for facilities for such instruction, during the year ended June 30, 1908.*

I. For instruction, viz.:

For the salaries of (1) Professor of Agricultural Chemistry, \$400.00; (2) Professor of Agriculture, \$983.38; (3) Professor of Horticulture, \$1,000.00; (4) Instructors in Horticulture, \$153.88; (5) Assistant Professor of Animal Husbandry, \$600.00; (6) Associate Professor of Dairying, \$625.00.....	\$3,762.26
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II. For facilities, as follows:

For apparatus, stock, and materials.....	603.84
For text-books and reference books.....	116.68

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Total .....	\$4,482.78
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**SCHEDULE B.**—*Disbursements for instruction in Mechanic Arts, and for facilities for such instruction, during the year ended June 30, 1908.*

I. For instruction, viz.:

For the salaries of (1) Professor of Mechanical Engineering, \$2,000.00; (2) Professor of Drawing and Design, \$1,600.00; (3) Instructor of Drawing, \$666.60; (4) Instructors in Machine Work, \$1,045.00; (5) Instructor in Wood Work, \$600.00; (6) Professor of Electrical Engineering, \$983.30; (7) Assistant Professor of Electrical Engineering, \$625.00; (8) Assistant in Electrical Engineering, \$500.00 .....	\$8,019.90
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II. For facilities, as follows:

For apparatus, machinery, stock and material .....	1,869.45
For text-books and reference books.....	150.36

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Total .....	\$10,039.71
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**SCHEDULE C.**—*Disbursements for instruction in English Language, and for facilities for such instruction, during the year ended June 30, 1908.*

I. For instruction, viz.:

For the salaries of (1) Associate Professor of English, \$1,066.61; (2) Instructor in English, \$312.50 .....	\$1,379.11
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II. For facilities, as follows:

For text-books and reference books.....	155.70
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Total .....	\$1,534.81
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SCHEDULE D.—*Disbursements for instruction in Mathematical Science, and for facilities for such instruction, during the year ended June 30, 1908.*

I. For instruction, viz.:	
For the salaries of (1) Professor of Mathematics, \$2,000.00; (2) Instructors in Mathematics, \$522.50	\$2,522.50
II. For facilities, as follows:	
For apparatus, stock, and materials.....	12.61
For text-books and reference books.....	9.50
Total .....	<hr/> \$2,544.61

SCHEDULE E.—*Disbursements for instruction in Natural and Physical Science, and for facilities for such instruction, during the year ended June 30, 1908.*

I. For instruction, viz.:	
For the salaries of (1) Professor of Chemistry, \$2,500.00; (2) Assistant Professor of Chemistry, \$1,200.00; (3) Instructor in Chemistry, \$833.30; (4) Professor of Physics, \$983.30; (5) Assistant Professor of Physics, \$625.00; (6) Associate Professor of Botany, \$728.78; (7) Professor of Zoology and Entomology, \$800.04; (8) Instructors in Entomology, \$973.73 .....	\$8,644.15
II. For facilities, as follows:	
For apparatus, stock and materials.....	955.79
For text-books and reference books.....	331.29
Total .....	<hr/> \$9,931.23

SCHEDULE F.—*Disbursements for instruction in Economic Science, and for facilities for such instruction, during the year ended June 30, 1908.*

I. For instruction, viz.:	
For Professor of Economic Science.....	\$1,400.00
II. For facilities, as follows:	
For text-books and reference books.....	66.86
Total .....	<hr/> \$1,466.86



## COLLEGE TREASURER'S REPORT TO TRUSTEES

To the President and Trustees of the New Hampshire College of Agriculture and the Mechanic Arts:—Your Treasurer respectfully submits his report for the period from July 1, 1906 to July 1, 1907.

WALTER M. PARKER, Treasurer, in account with New Hampshire College of Agriculture and the Mechanic Arts.

Income Conant Fund .....	\$2,845.00
Interest State Bonds .....	4,800.00
State Appropriation .....	13,000.00
Government Appropriation .....	52,000.00
W. D. Gibbs, President.....	26,265.23
L. Thompson, Treas. Real Estate Com.....	215.30
Income Pillsbury Fund .....	7.00
Adams Fund (To reimburse College for payments on account this Fund to June 30, 1906).....	2,119.79
Borrowed .....	13,469.49
Income Hamilton Smith Fund .....	400.00
Library Fund (To reimburse College for payments made on account Library) .....	306.90
	<hr/>
	\$115,428.71
Schedules .....	\$102,126.26
Notes .....	12,729.56
Interest on Notes .....	425.38
Cash on hand, July 1, 1907.....	147.51
	<hr/>
	\$115,428.71

## LIBRARY FUND.

Andrew Carnegie .....	\$20,000.00
Hamilton Smith Estate .....	12,888.00
	<hr/>
	\$32,888.00
Schedules .....	\$31,638.13
Cash on hand July 1, 1907.....	1,249.87
	<hr/>
	\$32,888.00

## COLLEGE TREASURER'S REPORT TO TRUSTEES

To the President and Trustees of the New Hampshire College of Agriculture and the Mechanic Arts:—Your Treasurer respectfully submits his report for the period from July 1, 1907 to July 2, 1908.

WALTER M. PARKER, Treasurer, in account with New Hampshire College of Agriculture and the Mechanic Arts.

Income Conant Fund .....	\$2,805.00
Interest State Bonds .....	4,800.00
State Appropriation .....	47,000.00
Government Appropriation .....	54,000.00
W. D. Gibbs, President .....	23,571.29
L. Thompson, Treas. Real Estate Com.....	106.13
Income Pillsbury Fund .....	7.00
Conant Fund Hathaway Loan.....	1,600.00
Interest Hamilton Smith Fund.....	400.00
Interest Smythe fund .....	80.00
Borrowed .....	28,930.57
Cash Balance, July 1, 1907.....	147.51
	<hr/>
	\$163,447.50
Schedules .....	\$129,147.03
Notes .....	29,302.57
Interest on Notes .....	203.22
Principal Hathaway Loan transfer to Man. Sv. Bk. account No. 84,042.....	1,600.00
Cash on hand July 2, 1908.....	3,194.68
	<hr/>
	\$163,447.50

## LIBRARY FUND.

Cash Balance, July 1, 1907.....	\$1,249.87
	<hr/>
	\$1,249.87
Schedules .....	\$1,190.07
Cash on hand July 2, 1908.....	59.80
	<hr/>
	\$1,249.87

**MRS. SHERLY ONDERDONK FUND.**

Received from Smith & Perkins.....	\$16,000.00
	<hr/>
	\$16,000.00
Schedules .....	\$3,820.00
Cash on hand July 2, 1908.....	12,180.00
	<hr/>
	\$16,000.00

Annual financial reports for each year ending June 30 are required of the College by the United States Government. Biennial reports to the Legislature for period ending August 31, are now required by the State. Since it is hardly practical to close the financial accounts twice within two months and since none of the expenditures during July and August of the present year are from state funds, it has been deemed advisable to render a financial statement to July 1 as required by the United States Government and other reports to Sept. 1 as required by the State.

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**NOTE INDEBTEDNESS AND FUND STATEMENT,  
JUNE 30, 1907.**

PREPARED BY C. H. PETTEE, AUDITOR.

**Note Indebtedness.****OUTSTANDING NOTES.**

Notes outstanding July 1, 1906	\$17,729.56
Manchester National Bank, note dated Dec. 28, 1906....	3,158.63
Manchester Savings Bank, note dated March 1, 1907.....	3,500.00
Manchester Savings Bank, note dated March 28, 1907.....	6,810.86
	<hr/>
	\$31,199.05

## \*NOTES PAID.

Manchester Savings Bank, note dated May 31, 1906.....	\$6,000.00	
Manchester National Bank, note dated June 29, 1906...	6,229.56	
Manchester National Bank, note dated April 28, 1906...	500.00	
	<hr/>	\$12,729.56
Total Note Indebtedness..		<hr/> \$18,469.49

## Fund Statement.

## CONANT FUND.

Receipts .....	\$2,845.00
Expenditures .....	2,845.00

## LAND GRANT.

Receipts .....	\$4,800.00
Pres. and Sec'y: Salaries..	\$3,394.90
Modern Language: Inst....	1,400.00
Library: Books .....	5.10
	<hr/> 4,800.00

## GENERAL AND MISCELLANEOUS INCOME (EXP. STA.) FUND.

## Receipts—

Cash on hand, July 1, 1906 (General) .....	\$678.73	
State Appropriation .....	13,000.00	
W. D. Gibbs, President....	26,265.23	
Lucien Thompson, Treasurer Real Estate Committee...	215.30	
Misc. Inc.: Exp. Station....	2,476.53	
	<hr/>	\$42,635.79
Expenditures .....	42,514.53	
Cash on hand July 1, 1907....	<hr/>	\$121.26

\*Several hundred dollars in interest have been saved to the State, during the past year, by using current funds early in the year to pay old indebtedness and by reborrowing later as the money was needed. For details see Treasurer's report.

## ADAMS FUND.

Receipts 1906 (See Treasurer's Report for 1906).....		\$5,000.00
Expenditures .....	\$2,880.21	
	2,119.79	5,000.00
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Receipts 1907 .....		\$7,000.00
Expenditures .....		7,000.00
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## HATCH FUND.

Receipts .....	\$15,000.00
Expenditures .....	15,000.00
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## MORRILL FUND.

Receipts .....		\$25,000.00
Expenditures—		
Agr. Sci. Dept.....	\$2,292.54	
Farm Dept. ....	364.00	
Dairy Dept. ....	746.54	
Horticultural Dept. ....	978.18	
Mech. Eng. Dept.....	5,042.42	
Elect. Eng. Dept.....	1,923.21	
Drawing Dept. ....	1,338.86	
Eng. Lang. Dept.....	1,126.02	
Math. Sci. Dept.....	2,158.42	
Chem. Dept. ....	4,472.53	
Phys. Sci. Dept.....	1,451.36	
Bot. and Bact. Dept.....	452.60	
Zoological Dept. ....	1,140.66	
Econ. Sci. Dept.....	1,512.66	
	<hr/>	\$25,000.00

## ROSECRANS W. PILLSBURY FUND.

Receipts .....	\$7.00	
Cash on hand July 1, 1906....	19.25	
Cash on hand July 1, 1907,...	<hr/>	\$26.25

## HAMILTON SMITH FUND.

Receipts .....	\$400.00
Expenditures .....	400.00
<hr/>	

## NEW LIBRARY FUND.

Receipts .....	\$32,888.00	
Expenditures .....	31,638.13	
Cash on hand July 1, 1907....	<hr/>	\$1,249.87

**NOTE INDEBTEDNESS AND FUND STATEMENT,  
JULY 2, 1908.**

PREPARED BY C. H. PETTEE, AUDITOR.

**Note Indebtedness.**

OUTSTANDING NOTES.

Manchester National Bank, date June 2, 1904.....	\$5,000.00	
Manchester Savings Bank, date Dec. 28, 1906 .....	3,158.63	
Manchester Savings Bank, date Mar. 1, 1907.....	3,500.00	
Manchester Savings Bank, date Mar. 28, 1907 .....	6,810.86	
	<hr/>	\$18,469.49

NEW NOTES.

Manchester National Bank, date Aug. 29, 1907.....	\$1,179.45	
Manchester National Bank, date Mar. 2, 1908.....	1,021.93	
Manchester National Bank, date Mar. 31, 1908.....	6,331.70	
Manchester National Bank, date April 3, 1908.....	2,300.00	
Manchester National Bank, date May 1, 1908.....	1,556.95	
Manchester National Bank, date June 1, 1908.....	7,101.46	
Manchester National Bank, date June 30, 1908.....	9,439.08	
	<hr/>	\$28,930.57

## \*NOTES PAID.

July 9, 1907. All notes un-		
paid on July 1, 1907.....	\$18,469.49	
Sept. 9, 1907 .....	1,179.45	
Apr. 3, 1908 .....	2,300.00	
Apr. 9, 1908 .....	1,021.93	
Apr. 9, 1908 .....	6,331.70	
	<hr/>	\$29,302.57

## NOTES UNPAID JULY 2, 1908.

Manchester National Bank....	\$1,556.95	
Manchester National Bank....	7,101.46	
Manchester Savings Bank....	9,439.08	
	<hr/>	\$18,097.49

**Fund Statement.**

## CONANT FUND.

Receipts .....	\$2,805.00	
Expenditures .....	2,805.00	
	<hr/>	

## LAND GRANT.

Receipts .....	\$4,800.00	
Pres. and Sec.: Salaries....	\$2,920.88	
Mod. Lang.: Instruction....	1,879.12	4,800.00
	<hr/>	<hr/>

## ROSECRANS W. PILLSBURY FUND.

Cash on hand July 1, 1907....	\$26.25	
Receipts .....	7.00	
	<hr/>	\$33.25

## STUDENT LOAN FUND.

Receipts .....	\$300.00	
Interest .....	2.00	
	<hr/>	
	\$302.00	
Expenditures .....	\$300.00	
Balance .....	<hr/>	\$2.00

\*Several hundred dollars in interest have been saved to the State during the past year by using current funds early in the year to pay old indebtedness and by reborrowing later as the money was needed. For details see Treasurer's Report.



## COLLEGE OF AGRICULTURE

## HAMILTON SMITH FUND.

Receipts .....	\$400.00
Expenditures .....	400.00

## MORRILL FUND.

Receipts .....	\$30,000.00
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## Expenditures—

Agri. Sci. Dept.....	\$1,663.30
Horticultural Dept. ....	1,182.61
Forestry Dept. ....	54.78
Animal Husb. Dept.....	600.00
Dairy Dept. ....	962.49
Creamery Dept. ....	19.60
Mech. Eng. Dept.....	2,834.67
Elect. Eng. Dept.....	3,261.57
Drawing Dept. ....	2,293.47
Shop Work .....	1,645.00
Eng. Lang. Dept.....	1,534.81
Math. Sci. Dept.....	2,544.61
Chemical Dept. ....	5,211.64
Phys. Sci. Dept.....	1,952.13
Botanical Dept. ....	851.53
Zoological Dept. ....	1,915.93
Econ. Sci. Dept.....	1,466.86
	<hr/>
	\$30,000.00

## LIBRARY FUND.

Balance on hand July 1, 1907..	\$1,249.87	
Expenditures .....	1,190.07	
Balance on hand July 2, 1908..	<hr/>	\$59.80

## STATE APPROPRIATION, (ORDINARY).

Receipts .....	\$13,000.00
Expenditures—	
Pres. and Sec.: Salaries....	\$2,460.02
Curator: Expense .....	8.21
Labor .....	1,046.08
Salary .....	849.92
Supplies .....	67.30
Freight and Express....	1.08

Eng. Lang.: Instruction....	\$266.65
Freight and Express....	.25
Econ. Sci.: Instruction.....	600.00
Roads and Grounds.....	697.55
Advertising .....	153.46
Clerical Work .....	200.00
Freight and Express.....	526.14
Fire Insurance Premiums...	959.08
Post., Sta., and Ptg.....	997.55
Forestry: Tools .....	1.92
Math. Sci.: Freight and Express .....	.30
Contingent Expenses .....	227.07
Farm: Labor .....	1,763.65
Hort.: Labor .....	1,370.95
Forestry: Labor .....	802.82
	<hr/>
	\$13,000.00

## STATE APPROPRIATION, (SPECIAL).

Receipts .....	\$34,000.00
Expenditures—	
Dormitory .....	\$9,629.60
Library .....	8,337.07
New Boilers .....	6,669.97
Buildings and Repairs .....	2,540.51
Furniture and Fixtures....	633.04
Library Grading .....	500.00
Drake Land Purchase .....	300.00
Roads and Grounds .....	400.00
Librarians' Salaries .....	1,026.63
Coal .....	1,475.75
	<hr/>
	\$31,512.57
Balance .....	<hr/>
	\$2,487.43

## GENERAL FUND.

Receipts—	
Cash on hand July 1, 1907..	\$121.26
W. D. Gibbs, President.....	23,571.29
Lucien Thompson, Treasurer	
Real Estate Committee...	106.13

Interest Frederick Smythe Fund .....	\$80.00	
	<hr/>	
	\$23,878.68	
Expenditures .....	23,732.37	
Balance .....	<hr/>	\$146.31

## MRS. SHERLY ONDERDONK FUND.

Receipts .....	\$16,000.00	
Expenditures .....	3,820.00	
Balance on hand July 2, 1908..	<hr/>	\$12,180.00

## MISCELLANEOUS INCOME: EXPERIMENT STATION.

Receipts .....	\$1,994.46	
Expenditures .....	1,993.82	
Balance .....	<hr/>	\$ .64

## HATCH FUND.

Receipts .....	\$15,000.00	
Expenditures .....	14,998.42	
Balance .....	<hr/>	\$1.58

## ADAMS FUND.

Receipts .....	\$9,000.00	
Expenditures .....	8,476.53	
Balance .....	<hr/>	\$523.47

## SUMMARY FUND BALANCES.

Rosecrans W. Pillsbury Fund.....	\$33.25
Student Loan Fund .....	2.00
Library Fund .....	59.80
State Appropriation, (Special) .....	2,487.43
General Fund .....	146.31
Mrs. Sherly Onderdonk Fund.....	12,180.00
Mis. Inc.: Experiment Station .....	.64
Hatch Fund .....	1.58
Adams Fund .....	523.47
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Cash on hand as per Treasurer's Report.....	\$15,434.48

**PRESIDENT'S FINANCIAL REPORT TO TRUSTEES.**

W. D. GIBBS, PRESIDENT.

Summary of Transactions, July 1, 1906—June 30, 1907.

**Income.**

Receipts from Tuition, Fees, Farm, Cream- ery and Book Sales, deposited with Treasurer .....	\$26,265.23
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**Expenditures by Schedules.**

1906.

*June 30.	Schedule No. 35 .....	\$1,914.32
* 30,	" " 36 .....	965.39
July 16.	" " 1 .....	972.00
31.	" " 2 .....	5,908.32
Aug. 10.	" " 3 .....	750.55
15.	" " 4 .....	784.75
31.	" " 5 .....	6,295.36
Sept. 8.	" " 6 .....	1,200.00
15.	" " 7 .....	710.57
29.	" " 8 .....	8,230.90
*Oct. 6.	" " 9 .....	2,119.79
15.	" " 10 .....	632.92
20.	" " 11 .....	4,000.00
24.	" " 12 .....	1,336.17
31.	" " 13 .....	8,204.28
Nov. 15.	" " 14 .....	592.16
22.	" " 15 .....	4,593.70
30.	" " 16 .....	6,631.35
Dec. 5.	" " 17 .....	400.00
15.	" " 18 .....	648.94
15.	" " 19 .....	120.00
20.	" " 20 .....	3,000.00
31.	" " 21 .....	6,658.10

1907.

Jan. 15.	" " 22 .....	827.01
15.	" " 23 .....	2,150.81
31.	" " 24 .....	7,908.42
Feb. 15.	" " 25 .....	637.75
20.	" " 26 .....	1,000.00
28.	" " 27 .....	6,216.07

\*See Treasurer's Report for 1906.

Mar.	15.	Schedule No. 28	.....	\$518.35	
	25.	" "	29	.....	2,000.00
	31.	" "	30	.....	7,456.02
Apr.	15.	" "	31	.....	710.26
	30.	" "	32	.....	7,424.92
May	6.	" "	33	.....	3,000.00
	15.	" "	34	.....	741.24
	15.	" "	35	.....	130.00
	31.	" "	36	.....	6,732.91
June	15.	" "	37	.....	1,614.40
	30.	" "	1 Transfer.....		306.90
	30.	" "	38	.....	9,819.26
	30.	" "	39	.....	7,900.00
					<hr/> \$133,764.39

### Department Accounts.

#### AGRICULTURAL DEPARTMENT.

##### *Agricultural Science Department, (Morrill).*

#### Receipts. Expenditures.

Agr. Sci.: Apparatus	.....	\$134.31	
Books	.....	70.74	
Instruction	.....	1,200.00	
Stock	.....	337.48	
Animal Husbandry			
Instruction	....	550.01	
			<hr/> \$2,292.54

##### *Agricultural Science Department, (General).*

Agr. Sci.: Supplies	.....	\$17.77	
Freight and Express.		10.05	
Post., Sta., and Ptg..		7.50	
Traveling Expenses .		28.32	
Stock	.....	8.82	
			<hr/> \$72.46

##### *Farm Department, (Morrill).*

Farm: Live Stock	.....	\$364.00	\$364.00
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*Farm Department, (General).*

	Receipts.	Expenditures.	
Farm: Buildings and Repairs		\$239.77	
Blacksmithing .....		77.70	
Feeding Stuffs .....		1,397.85	
Freight and Express..		56.12	
Heat, Light and Water		41.26	
Labor .....		1,290.95	
Live Stock .....		185.25	
Supplies .....		152.35	
Tools, etc. ....		53.98	
Seeds .....		2.37	
Sales .....	\$2,861.39		
	<hr/>	<hr/>	
	\$2,861.39	\$3,497.60	\$636.21

## DAIRY DEPARTMENT.

*Dairy Department, (Morrill).*

Dairy; Apparatus .....	\$223.74	
Instruction .....	522.80	
	<hr/>	\$746.54

*Dairy Department, (General).*

Dairy: Freight and Express..	\$89.97	
Furniture and Fixtures	26.40	
Post., Sta., and Ptg...	43.15	
Labor .....	428.60	
Supplies .....	418.61	
Heat, Light and Water	163.55	
Milk .....	9,520.67	
Sales .....	\$10,714.69	
	<hr/>	<hr/>
	\$10,714.69	\$10,690.95 + \$23.74

## HORTICULTURAL DEPARTMENT.

*Horticultural Department, (Morrill).*

Hort.: Apparatus .....	\$36.30	
Books ....	1.10	
Instruction .....	940.28	
Stock .....	.50	
	<hr/>	\$978.18

*Horticultural Department, (General).*

	Receipts.	Expenditures.	
<b>Hort.:</b> Apparatus .....		\$125.34	
Buildings and Repairs .....		401.71	
Feeding Stuffs .....		250.75	
Freight and Express .....		171.24	
Fertilizers .....		394.78	
Blacksmithing .....		42.05	
Labor .....		1,963.41	
Post., Sta., and Ptg... ..		31.49	
Seeds .....		257.79	
Supplies .....		736.30	
Tools, etc. .... ..		107.65	
Traveling Expenses.. ..		36.09	
Sales .....	\$2,367.00		
Live Stock .....		12.00	
		<hr/>	
	\$2,367.00	\$4,530.60	\$2,163.60

*Forestry Department, (General).*

<b>Forestry:</b> Furniture and fix- tures .....		\$44.07	
Seeds .....		23.12	
Apparatus .....		20.24	
Labor .....		1,034.61	
Sales .....	\$1,745.95		
Tools, etc .....		4.86	
Roads and Grounds... ..		10.50	
		<hr/>	
	\$1,745.95	\$1,137.40	+\$608.55

*Roads and Grounds, (General.)*

<b>Roads and Grounds</b> .....	\$1,028.10	\$1,028.10
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## CHEMICAL DEPARTMENT.

*Chemical Department, (Morrill).*

<b>Chem.:</b> Books .....	\$206.89	
Instruction .....	3,616.62	
Stock .....	578.86	
Apparatus .....	70.16	
	<hr/>	\$4,472.53



*Chemical Department, (General).*

	Receipts.	Expenditures.	
Chem.: Apparatus .....		\$7.25	
Freight and Express		41.01	
Post., Sta., and Ptg..		38.06	
Breakage Account ...	\$493.29		
Supplies .....		1.22	
	<hr/>	<hr/>	
	\$493.29	\$87.54	+\$405.75

## MECHANICAL ENGINEERING DEPARTMENT.

*Mechanical Engineering Department, (Morrill).*

Mech. Eng.: Apparatus .....	\$618.32		
Books .....	141.02		
Instruction .....	2,000.00		
Shop Work Instruction	1,985.49		
Stock .....	297.59		
	<hr/>		
		\$5,042.42	

*Mechanical Engineering Department, (General).*

Mech. Eng.: Apparatus.....	\$2.00		
Freight and Express..	20.73		
Post., Sta., and Ptg...	5.30		
Supplies .....	14.65		
Sales .....	\$64.07		
Traveling Expenses ..	19.33		
	<hr/>		
	\$64.07	\$62.01	+\$2.06

*Power and Service Department, (General).*

P. and S.: Coal.....	\$4,156.17		
Freight and Express..	217.98		
Post., Sta., and Ptg...	5.30		
Labor Sales .....	\$266.67		
Supplies .....	1,562.48		
Tools .....	270.55		
Labor .....	2,869.63		
	<hr/>		
	\$266.67	\$9,082.11	\$8,815.44

*Curator's Department, (General)*

Cura.: Expense .....	\$23.34		
Labor .....	728.64		
Supplies .....	159.28		
Freight and Express..	2.20		
	<hr/>		
		\$913.46	

*Buildings and Repairs, (General).*

Receipts. Expenditures.

## Buildings and Repairs. Pres.

House .....	\$50.70	
General .....	\$13.46	
	<hr/>	\$864.16

## DRAWING DEPARTMENT.

*Drawing Department, (Morrill).*

Drawing: Instruction.....	\$1,299.99	
Stock .....	11.94	
Apparatus .....	4.00	
Books .....	22.93	
	<hr/>	\$1,338.86

*Drawing Department, (General).*

Drawing: Freight and Express.	\$4.15	
Furniture and Fixtures	9.75	
Supplies .....	.45	
	<hr/>	\$14.35

## ELECTRICAL ENGINEERING DEPARTMENT.

*Electrical Engineering Department, (Morrill).*

Elec. Eng.: Apparatus ....	\$561.64	
Instruction .....	1,359.96	
Stock .....	1.61	
	<hr/>	\$1,923.21

*Electrical Engineering Department, (General).*

Elec. Eng.: Apparatus.....	\$1.42	
Freight and Express.	28.67	
Traveling Expenses .	35.39	
Post., Sta., and Ptg..	25.34	
	<hr/>	\$90.82

## PHYSICAL SCIENCE DEPARTMENT.

*Physical Science Department, (Morrill).*

Phys. Sci.: Apparatus.....	\$28.12	
Books .....	61.03	
Instruction .....	1,359.96	
Stock .....	2.25	
	<hr/>	\$1,451.36

*Physical Science Department, (General).*

Phys. Sci.: Freight and Express.	\$ .15	
Post., Sta., and Ptg.....	13.32	
Traveling Expenses ....	2.27	
	<hr/>	\$15.74

## ENGLISH LANGUAGE DEPARTMENT. ....

*English Language Department, (Morrill).*

## Receipts. Expenditures.

Eng. Lang.: Books .....	\$207.66	
Instruction .....	918.36	
	<hr/>	\$1,126.02

*English Language Department, (General).*

Eng. Lang.: Instruction ....	\$213.34	\$213.34
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*Secretary of Faculty, (General).*

Sec. of Fac.: Post., Sta., and Ptg	\$21.50	
Freight and Express ...	.30	
	<hr/>	\$21.80

## MATHEMATICAL SCIENCE DEPARTMENT.

*Mathematical Science Department, (Morrill).*

Math. Sci.: Instruction ....	\$2,131.27	
Apparatus .....	27.15	
	<hr/>	\$2,158.42

*Mathematical Science Department, (General).*

Math. Sci.: Freight and Express.	\$ .45	
Post., Sta., and Ptg.....	.60	
	<hr/>	\$1.05

## MODERN LANGUAGE DEPARTMENT.

*Modern Language Department, (Land Grant).*

Mod. Lang.: Instruction....	\$1,400.00	\$1,400.00
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## ECONOMIC SCIENCE DEPARTMENT.

*Economic Science Department, (Morrill).*

Econ. Sci.: Books.....	\$112.66	
Instruction .....	1,400.00	
	<hr/>	\$1,512.66

*Economic Science Department, (General).*

Econ. Sci.: Instruction.....	\$600.00	\$600.00
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## LIBRARY DEPARTMENT.

*Library Department, (General).*

Library: Clerical Work .....	\$685.07	
Books .....	64.95	
Freight and Express ..	17.30	
Supplies .....	20.09	
Furniture and Fixtures	31.00	
	<hr/>	\$818.41

## ZOOLOGICAL DEPARTMENT.

*Zoological Department, (Morrill).*

	Receipts.	Expenditures.	
Zool.: Apparatus .....		\$104.33	
Books .....		98.47	
Instruction .....		900.00	
Stock .....		37.86	
		<hr/>	\$1,140.66

*Zoological Department, (General).*

Zool.: Supplies .....		\$48.61	
Traveling Expenses...		6.78	
Freight and Express..		16.45	
Furniture and Fixtures		10.54	
Labor .....		136.10	
Post., Sta., and Ptg..		4.50	
Laboratory .....	\$38.88		
Buildings and Repairs		5.86	
	<hr/>	<hr/>	
	\$38.88	\$228.84	\$189.96

## MILITARY SCIENCE DEPARTMENT.

*Military Science Department, (General).*

Mil. Sci.: Supplies .....		\$91.22	
Freight and Express.		25.10	
Post., Sta., and Ptg..		15.75	
Band .....		140.15	
Labor .....		35.99	
		<hr/>	\$308.21

## BOTANICAL AND BACTERIOLOGICAL DEPARTMENT.

*Botanical and Bacteriological Department, (Morrill).*

Bot. and Bact.: Apparatus ..		\$152.60	
Instruction .....		300.00	
		<hr/>	\$452.60

*Botanical and Bacteriological Department, (General).*

Bot. and Bact.: Stock .....		\$2.12	
Freight and Express....		2.45	
Furniture and Fixtures.		5.00	
Labor .....		10.19	
Supplies .....		.67	
		<hr/>	\$20.43

*Miscellaneous Accounts, (General).*

	Receipts.	Expenditures.	
Office Supplies .....		\$41.39	
Advertising .....		420.52	
Athletic Appropriation .....		1,120.00	
Book Store .....		2,673.85	
Book Store: Sales.....	\$2,845.34		
Chapel Expenses .....		134.27	
Clerical Work .....		207.95	
Commencement Expenses ....		293.55	
Conant Scholarships .....		2,845.00	
Contingent Expenses .....		546.86	
Freight and Express .....		634.47	
Furniture and Fixtures.....		337.07	
Fire Ins. Premiums.....		1,607.87	
Post., Sta., and Ptg.....		658.29	
Valentine Smith Scholarships		400.00	
Students' Fees .....	6,608.50		
Traveling Expenses .....		189.18	
Trustees Expenses .....		689.30	
Mis. Inc.: Exp. Station.....	165.84		
Erskine Mason Prize.....		4.00	
	\$9,619.68	\$12,803.57	\$3,183.89

*Miscellaneous Accounts, (Land Grant).*

Pres. and Sec.: Salaries.....	\$3,394.90	
Library: Books .....	5.10	
		\$3,400.00

*Miscellaneous Accounts, (New Library).*

New Library .....	\$31,638.13	\$31,638.13
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## HATCH FUND.

Salaries .....	\$7,907.63
Labor .....	2,641.24
Publications .....	1,195.87
Postage and Stationery .....	152.32
Freight and Express .....	189.59
Heat, Light and Water.....	222.25
Chemical Supplies .....	124.08
Seeds and Sundry Supplies....	591.78
Fertilizers .....	231.02
Feeding Stuffs .....	20.17
Library .....	229.06
Tools, etc. ....	434.00

	Receipts.	Expenditures.
Furniture and Fixtures .....		\$56.17
Scientific Apparatus .....		213.09
Live Stock .....		206.17
Traveling Expenses .....		453.22
Contingent Expenses .....		16.16
Buildings and Repairs.....		116.18
		<hr/> \$15,000.00

## ADAMS FUND.

Salaries .....	\$4,556.60
Labor .....	589.19
Freight and Express .....	131.44
Chemical Supplies .....	16.44
Seeds and Sundry Supplies....	385.89
Feeding Stuffs .....	146.93
Tools, etc. ....	14.90
Scientific Apparatus .....	615.26
Live Stock .....	105.00
Traveling Expenses .....	93.22
Buildings and Repairs .....	345.13
	<hr/> \$7,000.00

## PRESIDENT'S FINANCIAL REPORT TO TRUSTEES.

W. D. GIBBS, PRESIDENT.

Summary of Transactions, July 1, 1907—July 2, 1908.

## Income.

Receipts from Tuition, Fees, Farm, Creamery and Book Sales, deposited with

Treasurer ..... \$23,571.29

## Expenditures by Schedules.

1907.

July	15.	Schedule	No. 1	.....	\$797.96
	31.	"	" 2	.....	11,998.28
Aug.	15.	"	" 3	.....	750.43
	31.	"	" 4	.....	8,467.29
Sept.	14.	"	" 5	.....	629.51
	30.	"	" 6	.....	6,636.12
Oct.	15.	"	" 7	.....	570.82
	31.	"	" 8	.....	17,311.29
Nov.	15.	"	" 9	.....	545.40
	15.	"	" 10	.....	838.32
	30.	"	" 11	.....	10,181.99

1908.

Dec.	16.	Schedule No. 12	.....	\$455.21
	16.	" "	13	..... 112.50
	31.	" "	14	..... 10,807.47
Jan.	15.	" "	15	..... 552.75
	31.	" "	16	..... 10,090.26
	31.	" "	17	..... 351.75
Feb.	15.	" "	18	..... 529.75
	18.	" "	19	..... 4,700.00
	29.	" "	20	..... 7,641.85
Mar.	16.	" "	21	..... 488.96
	31.	" "	22	..... 7,054.87
	31.	" "	23	..... 2,300.00
Apr.	15.	" "	24	..... 604.96
	30.	" "	25	..... 7,630.80
May	5.	" "	26	..... 3,820.00
	15.	" "	27	..... 87.50
	15.	" "	28	..... 642.09
	30.	" "	29	..... 8,274.04
June	15.	" "	30	..... 724.85
	30.	" "	31	..... 8,559.58
				————— \$134,157.10

**Department Accounts.**

## AGRICULTURAL DEPARTMENT.

*Agricultural Science Department, (Morrill).*

## Receipts. Expenditures.

Agr. Sci.: Apparatus.....	\$143.30	
Books .....	67.94	
Instruction .....	1,383.38	
Stock .....	68.68	
Animal Husb. Instruction.	600.00	
		————— \$2,263.30

*Agricultural Science Department, (General).*

Agr. Sci.: Labor.....	\$15.00	
Supplies .....	21.77	
Freight and Express.....	19.35	
Post., Sta., and Ptg.....	20.66	
Traveling Expenses .....	10.27	
		————— \$87.05

*Agricultural Science Department, (\$34,000 State Appro.).*

Agri. Sci.: Buildings and Repairs.....	\$21.66	\$21.66
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*Farm Department, (General).*

	Receipts.	Expenditures.
<b>Farm:</b> Blacksmithing.....		\$128.84
Feeding Stuffs.....		1,733.43
Freight and Express..		44.24
Heat, Light and Water		40.62
Fertilizers .....		64.94
Labor Sales .....	\$1,015.10	
Herd Sales .....	1,325.53	
Produce Sales .....	1,101.51	
Live Stock .....		218.89
Supplies .....		195.64
Tools .....		26.85
Seeds .....		29.38
Foreman's Salary....		414.96
Traveling Expenses...		9.72
	<hr/>	<hr/>
	\$3,442.14	\$2,907.51 + \$534.63

*Farm Department, (\$34,000 State Appropriation).*

<b>Farm:</b> Buildings and Repairs.	\$95.15	\$95.15
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*Farm Department, (\$13,000 State Appropriation).*

<b>Farm:</b> Labor .....	\$1,763.65	\$1,763.65
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## DAIRY DEPARTMENT.

*Dairy Department, (Morrill).*

<b>Dairy:</b> Apparatus .....	\$308.78	
Instruction .....	625.00	
Stock .....	6.90	
Books .....	21.81	
	<hr/>	\$962.49

*Dairy Department, (General).*

<b>Dairy:</b> Freight and Express..	\$24.96	
Post., Sta., and Ptg..	4.12	
Tools .....	6.41	
Traveling Expenses...	3.43	
Labor .....	154.49	
Supplies .....	149.13	
Milk (to Sept. 14, '07)	1,738.00	
Sales (to Sept. 14, '07)	\$2,247.89	
	<hr/>	<hr/>
	\$2,247.89	\$2,080.54 + \$167.35

*Dairy Department, (\$34,000 State Appro.).*

## Receipts. Expenditures.

Dairy: Buildings and Repairs...	\$6.76	
Furniture and Fixtures.	58.25	
	<hr/>	\$65.01

*Creamery Department, (General).*

Creamery: Milk (from Sept.		
14, '07) .....	\$6,657.52	
Sales (from Sept. 14,		
'07) .....	\$7,909.47	
Labor .....	576.86	
Post., Sta., and Ptg...	6.00	
Freight and Express..	33.66	
Supplies .....	195.99	
	<hr/>	
	\$7,909.47	\$7,470.03 +\$439.44

*Creamery Department, (\$34,000 State Appropriation).*

Creamery: Buildings and Repairs	\$406.50	\$406.50
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*Creamery Department, (Morrill).*

Creamery: Apparatus .....	\$19.60	\$19.60
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## DRAWING DEPARTMENT.

*Drawing Department, (Morrill).*

Drawing: Instruction .....	\$2,266.60	
Stock .....	4.99	
Books .....	26.88	
	<hr/>	\$2,298.47

*Drawing Department, (General).*

Drawing: Traveling Expenses.	\$12.52	
Freight and Express..	5.48	
Post., Sta., and Ptg....	5.50	
Supplies .....	1.29	
	<hr/>	\$24.79

## HORTICULTURAL DEPARTMENT.

*Horticultural Department, (Morrill).*

Hort.: Books .....	\$26.93	
Instruction .....	1,153.88	
Stock .....	1.80	
	<hr/>	\$1,182.61

*Horticultural Department, (General).*

## Receipts. Expenditures.

Hort.: Books.....	\$1.00		
Feeding Stuffs .....	241.06		
Fertilizers .....	204.47		
Freight and Express..	115.24		
Blacksmithing .....	79.25		
Post., Sta., and Ptg...	.87		
Seeds .....	479.93		
Supplies .....	375.24		
Tools .....	22.92		
Traveling Expenses...	22.74		
Sales .....	\$2,319.88		
Foreman's Salary ....		300.00	
	\$2,319.88	\$1,842.72	+\$477.16

*Horticultural Department, (\$34,000 State Appro.).*

Hort.: Buildings and Repairs.	\$286.64	\$286.64
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*Horticultural Department, (\$13,000 State Appro.).*

Hort.: Labor .....	\$1,370.95	\$1,370.95
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*Forestry Department, (Morrill).*

Forestry: Apparatus .....	\$54.78	\$54.78
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*Forestry Department, (General).*

Forestry: Freight and Express	\$1.35	
Sales .....	\$212.59	
	\$212.59	\$1.35 +\$211.24

*Forestry Department, (\$13,000 State Appro.).*

Forestry: Labor .....	\$802.82	
Tools .....	1.92	
		\$804.74

*Roads and Grounds Department, (\$34,000 State Appro.).*

Roads and Grounds .....	\$900.00	\$900.00
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*Roads and Grounds Department, (\$13,000 State Appro.).*

Roads and Grounds .....	\$697.55	\$697.55
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## CHEMICAL DEPARTMENT.

*Chemical Department, (Morrill).*

Chemistry: Apparatus .....	\$3.80	
Books .....	129.79	
Instruction .....	4,533.30	
Stock .....	544.75	
		\$5,211.64

*Chemical Department, (General).*

	Receipts.	Expenditures.	
Chemistry: Stock .....	\$167.11		
Freight and Express..	47.37		
Post., Sta., and Ptg...	36.85		
Breakage Account....	\$515.35		
Supplies .....	16.08		
	<hr/>	<hr/>	
	\$515.35	\$267.41	+\$247.94

*Chemical Department, (\$34,000 State Appro.).*

Chemistry: Furniture and Fix- tures .....	\$3.80	\$3.80
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## ENGLISH LANGUAGE DEPARTMENT.

*English Language Department, (Morrill).*

Eng. Lang.: Books .....	\$155.70	
Instruction .....	1,379.11	
	<hr/>	\$1,534.81

*English Language Department, (General).*

Eng. Lang.: Post., Sta., and Ptg..	\$8.30	
Books .....	1.40	
	<hr/>	\$9.70

*English Language Department, (\$13,000 State Appro.).*

Eng. Lang.: Instruction .....	\$266.65	
Freight and Express....	.25	
	<hr/>	\$266.90

*Secretary of Faculty, (General).*

Sec. of Fac.: Post., Sta., and Ptg..	\$7.10	
Traveling Expenses .....	8.80	
	<hr/>	\$15.90

## MATHEMATICAL SCIENCE DEPARTMENT.

*Mathematical Science Department, (Morrill).*

Math. Sci.: Instruction.....	\$2,522.50	
Books .....	9.50	
Apparatus .....	12.61	
	<hr/>	\$2,544.61

*Mathematical Science Department, (\$13,000 State Appro.).*

Math. Sci.: Freight and Express.	\$ .30	\$ .30
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## MECHANICAL ENGINEERING DEPARTMENT.

*Mechanical Engineering Department, (Morrell).*

## Receipts. Expenditures.

Mech. Eng.: Apparatus .....	\$434.26	
Books .....	109.48	
Instruction .....	2,000.00	
Shop Work Instruction	1,645.00	
Stock .....	290.93	
		<hr/> \$4,479.67

*Mechanical Engineering Department, (General).*

Mech. Eng.: Stock .....	\$2.40	
Freight and Express..	18.11	
Post., Sta., and Ptg...	17.61	
Supplies .....	10.98	
Sales .....	\$41.92	
Labor .....	7.88	
	<hr/> \$41.92	<hr/> \$56.98
		\$15.06

*Mechanical Engineering Department, (\$34,000 State Appro.).*

Mech. Eng.: Buildings and Repairs	\$57.59	
Furniture and Fixtures...	65.87	
	<hr/>	\$123.46

*Power and Service Department, (General).*

P. and S.: Coal .....	\$1,253.58	
Freight and Express..	108.80	
Post., Sta., and Ptg...	5.31	
Labor Sales .....	\$894.52	
Supplies .....	1,832.69	
Tools .....	531.55	
Labor .....	2,637.00	
Heat, Light and Water	9.00	
	<hr/> \$894.52	<hr/> \$6,377.93
		\$5,483.41

*Power and Service Department, (\$34,000 State Appro.).*

P. and S.: Coal .....	\$1,475.75	\$1,475.75
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*Curator's Department, (\$13,000 State Appro.).*

Curator: Expense .....	\$8.21	
Labor .....	1,046.08	
Salary .....	849.92	
Supplies .....	67.30	
Freight and Express	1.08	
	<hr/>	\$1,972.59

*Buildings and Repairs Department, (\$34,000 State Appro.).*

## Receipts. Expenditures.

B. and R.: Pres. House.....	\$174.78	
General .....	1,416.05	
	<hr/>	\$1,590.83

## ELECTRICAL ENGINEERING DEPARTMENT.

*Electrical Engineering Department. (Morrill).*

Elec. Eng.: Apparatus .....	\$847.92	
Books .....	14.00	
Instruction .....	2,108.30	
Stock .....	291.35	
	<hr/>	\$3,261.57

*Electrical Engineering Department. (General).*

Elec. Eng.: Freight and Express	\$57.33	
Traveling Expenses...	20.62	
Post., Sta., and Ptg...	18.13	
Supplies .....	1.35	
Labor Sales.....	\$32.72	
	<hr/>	
	\$32.72	\$97.43
		\$64.71

*Electrical Engineering Department. (\$34,000 State Appro.).*

Phys. Sci.: Apparatus .....	\$245.73
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## PHYSICAL SCIENCE DEPARTMENT.

*Physical Science Department. (Morrill).*

Phys. Sci.: Freight and Express	\$245.73	
Books .....	70.30	
Instruction .....	1,608.30	
Stock .....	27.80	
	<hr/>	\$1,952.13

*Physical Science Department. (General).*

Phys. Sci.: Freight and Express	\$ .40	
Post., Sta., and Ptg..	5.81	
Labor Sales.....	\$24.21	
	<hr/>	
	\$24.21	\$6.21
		+\$18.00

*Physical Science Department. (\$34,000 State Appro.).*

Phys. Sci.: Furniture and Fixtures	\$8.00	\$8.00
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## COLLEGE OF AGRICULTURE

## MODERN LANGUAGE DEPARTMENT.

*Modern Language Department, (Land Grant).*

## Receipts. Expenditures.

Mod. Lang.: Instruction.....	\$1,879.12	\$1,879.12
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*Modern Language Department, (General).*

Mod. Lang.: Books .....	\$28.40	\$28.40
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## ECONOMIC SCIENCE DEPARTMENT.

*Economic Science Department, (Morrill).*

Econ. Sci.: Books.....	\$66.86	
Instruction .....	1,400.00	
		\$1,466.86

*Economic Science Department, (\$13,000 State Appropriation.)*

Econ. Sci.: Instruction.....	\$600.00	\$600.00
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## LIBRARY DEPARTMENT.

*Library Department, (General).*

Library: Clerical Work.....	\$1.00	
Books .....	58.00	
Freight and Express..	29.63	
Post., Sta., and Ptg...	7.86	
Supplies .....	158.14	
Fees .....	\$20.00	
		\$20.00
	\$20.00	\$254.63
		\$234.63

*Library Department, (\$34,000 State Appropriation).*

Library: Salary .....	\$1,026.63	\$1,026.63
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## ZOOLOGICAL DEPARTMENT.

*Zoological Department, (Morrill).*

Zoology: Apparatus .....	\$5.75	
Books .....	92.30	
Instruction .....	1,773.77	
Stock .....	44.11	
		\$1,915.93

*Zoological Department, (General).*

Zoology: Supplies .....	\$21.20	
Freight and Express.	28.37	
Labor .....	22.81	
Post., Sta., and Ptg....	9.40	
Laboratory .....	.10	
		\$81.88



*Zoological Department, (\$34,000 State Appropriation).*

	Receipts.	Expenditures.
Zoology: Furniture and Fix- tures .....	\$216.59	\$216.59

## MILITARY SCIENCE DEPARTMENT.

*Military Science Department, (General).*

Mil. Sci.: Supplies .....	\$8.23	
Freight and Express.	2.51	
Post., Sta., and Ptg..	9.89	
Band .....	46.25	
Labor .....	39.36	
Traveling Expenses	2.48	
Books .....	16.31	
	<hr/>	\$125.03

## BOTANY AND BACTERIOLOGICAL DEPARTMENT.

*Botany and Bacteriological Department, (Morrill).*

Bot. and Bact.: Books .....	\$38.90	
Instruction .....	728.78	
Apparatus .....	82.35	
Stock .....	1.50	
	<hr/>	\$851.53

*Botany and Bacteriological Department, (General).*

Bot. and Bact.: Freight and Express .....	\$2.53	
Post., Sta., and Ptg..	1.86	
Labor .....	9.20	
Laboratory .....	\$5.04	
Supplies .....	13.58	
	<hr/>	
	\$5.04	\$27.17
		\$22.13

*Botany and Bacteriological Department, (\$34,000 State Appro.).*

Bot. and Bact.: Furniture and Fixtures..	\$14.25	
Buildings and Repairs	75.38	
	<hr/>	\$89.63

## MISCELLANEOUS ACCOUNTS, (GENERAL.)

## Receipts. Expenditures.

Athletic Appropriation .....	\$1,095.00	
Book Store .....	2,370.09	
Book Store: Sales .....	\$2,461.33	
Chapel Expenses .....	135.00	
Commencement Expenses ....	309.57	
Office Supplies .....	34.07	
Student Fees .....	6,736.00	
Erskine Mason Prize.....	4.00	
Traveling Expenses .....	462.35	
Trustees' Expenses .....	428.70	
Smythe Book Fund .....	67.20	
Student Loan Fund .....	\$2.00	
	<hr/>	
	\$9,199.33	\$4,905.98 +\$4,293.35

## MISCELLANEOUS ACCOUNTS, (LAND GRANT).

Pres. and Sec.: Salaries ....	\$2,920.88	\$2,920.88
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## MISCELLANEOUS ACCOUNTS, (HAMILTON SMITH FUND).

Valentine Smith Scholarships.	\$400.00	\$400.00
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## MISCELLANEOUS ACCOUNTS, (CONANT FUND).

Conant Scholarships .....	\$2,805.00	\$2,805.00
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## MISCELLANEOUS ACCOUNTS, (LIBRARY FUND).

New Library .....	\$1,190.07	\$1,190.07
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## MISCELLANEOUS ACCOUNTS, (MRS. ORDERDONK FUND).

Dormitory .....	\$3,820.00	\$3,820.00
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## MISCELLANEOUS ACCOUNTS, (\$34,000 STATE APPROPRIATION).

Contingent Expenses (Drake land purchase .....	\$300.00	
Furniture and Fixtures .....	258.28	
New Library: Equipment ...	8,337.07	
New Boilers and Pipes.....	6,669.97	
Dormitory .....	9,629.60	
	<hr/>	\$25,194.92

## MISCELLANEOUS ACCOUNTS, (\$13,000 STATE APPROPRIATION.)

Advertising .....	\$153.46	
Clerical Work .....	200.00	
Contingent Expenses .....	227.07	
Freight and Express .....	526.14	
Fire Insurance Premiums...	959.08	
Post., Sta., and Ptg.....	997.55	
Pres. and Sec.: Salaries.....	2,460.02	
	<hr/>	\$5,523.32

# CATALOG.

## 1910

JULY

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## COLLEGE CALENDAR.

1908.

- Sept. 14-15. Entrance examinations begin Monday at 9 a. m.  
 Sept. 16. Registration, Wednesday. First semester begins.  
 Oct. 7. Stated meeting of Trustees.  
 Dec. 18. College closes Friday night.

## CHRISTMAS VACATION.

1909.

- Jan. 5. College opens Tuesday, at 8 a. m.  
 Jan. 13. Stated meeting of Trustees.  
 Feb. 1-5. Mid-year examinations.

## WINTER VACATION.

- Feb. 10. Registration, Wednesday. Second semester begins.  
 Apr. 14. Stated meeting of Trustees.  
 Apr. College closes Wednesday night preceding Fast Day.

## SPRING VACATION.

- Apr. College opens Tuesday following Fast Day, at 8 a. m.  
 June 8. Senior examinations completed 4 p. m.  
 June 9-14. Final examinations.  
 June 13. Baccalaureate sermon, Sunday at 10.45 a. m.  
 June 14. Prize Drill, 8 p. m., in the Armory.  
 June 15. Class Day. Stated meeting of Trustees.  
 June 16. Commencement Day. Senior promenade at 8 p. m.

## SUMMER VACATION.

- Sept. 10-14. Examinations for admission begin Friday at 9 a. m.  
 Sept. 15. Registration, Wednesday. First semester begins.  
 Oct. 13. Stated meeting of Trustees.  
 Dec. 17. College closes Friday night.

## CHRISTMAS VACATION.

1910.

- Jan. 4. College opens Tuesday at 8 a. m.  
 Jan. 12. Stated Meeting of Trustees.  
 Jan. 31—Feb. 4. Mid-year examinations.

## WINTER VACATION.

- Feb. 9. Registration, Wednesday. Second semester begins.

## BOARD OF TRUSTEES.

HIS EXCELLENCY, Gov. CHARLES M. FLOYD, *ex officio*.

CHARLES W. STONE, A. M., East Andover, *President*.

Term expires Oct. 9, 1909.

PRES. WILLIAM D. GIBBS, Durham, *ex officio*.

HON. LUCIEN THOMPSON, Durham, *Secretary*.

Term expires June 14, 1910.

HON. JOHN G. TALLANT, Pembroke.

Term expires July 20, 1909.

HON. WARREN BROWN, Hampton Falls.

Term expires June 14, 1910.

HON. ROSECRANS W. PILLSBURY, Londonderry.

Term expires Oct. 7, 1909.

HON. RICHARD M. SCAMMON, Stratham.

Term expires Aug. 30, 1911.

WALTER DREW, Colebrook.

Term expires Aug. 30, 1911.

HON. NAHUM J. BACHELDER, M. S., A. M., East Andover.

Term expires Jan. 5, 1911.

GORDON WOODBURY, A. B., PH. D., LL. B., Bedford.

Term expires Dec. 2, 1908.

EDWARD H. WASON, B. S., Nashua, *Alumni Trustee*.

Term expires July 1, 1910.

GEORGE W. CURRIER, M. D., Nashua.

Term expires June 14, 1910.

WALTER M. PARKER, A. B., Manchester, *Treasurer*.

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OFFICERS OF  
INSTRUCTION AND ADMINISTRATION.

WILLIAM D. GIBBS, D. Sc., President of the College.

CHARLES H. PETTEE, A. M., C. E., *Dean and Professor of Mathematics*.

CLARENCE W. SCOTT, A. M., *Professor of History and Political Economy*.

FRED W. MORSE, M. S., *Professor of Organic Chemistry*.

- CHARLES L. PARSONS, B. S., *Professor of Inorganic Chemistry.*  
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CHARLES E. HEWITT, B. S., M. M. E., *Professor of Electrical Engineering.*  
BETHEL S. PICKETT, B. S., *Professor of Horticulture.*  
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WILLIAM H. PEW, B. Sc. (Agr.), *Associate Professor of Animal Husbandry.*  
CHARLES JAMES, F. I. C., *Assistant Professor of Inorganic Chemistry.*  
A. M. BUCK, M. E., *Assistant Professor of Electrical Engineering.*  
FRANK R. BROWN, B. S., *Instructor in Machine Work.*  
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RAY A. SPENCER, A. B., *Instructor in English and Modern Languages.*  
HARRY E. INGHAM, B. S., *Instructor in Wood Work.*  
THOMAS J. LATON, B. S., *Instructor in Drawing.*  
WILLIAM M. BARROWS, B. S., S. M., *Instructor in Zoology.*  
C. FLOYD JACKSON, B. S., M. A., *Instructor in Entomology.*  
ISAAC M. LEWIS, A. B., A. M., *Instructor in Botany.*  
JASPER F. EASTMAN, B. S., *Assistant in Agronomy.*  
WILLIAM H. WICKS, M. S. (Agr.), *Assistant in Horticulture.*  
JOHN C. McNUTT, B. S. (Agr.), *Assistant in Animal Husbandry, Herdsman.*  
OSCAR W. STRAW, *Engineer and Curator of Buildings.*  
DAVID LUMSDEN, *Foreman of Gardens and Greenhouse.*  
GEORGE S. HAM, *Farm Foreman.*  
MABEL E. TOWNSEND, A. B., *Registrar.*  
MABEL HODGKINS, A. B., *Librarian.*



CHARLOTTE A. THOMPSON, *Assistant Librarian.*

NELLIE F. WHITEHEAD, *Purchasing Agent.*

LAVINIA BROWN, *Bookkeeper.*

MARCIA SANDERS, *Matron of Smith Hall.*

## NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION.

### BOARD OF CONTROL.

HON. JOHN G. TALLANT, <i>Chairman,</i>	Pembroke
CHARLES W. STONE, A. M., <i>Secretary,</i>	East Andover
HON. WARREN BROWN,	Hampton Falls
HON. N. J. BACHELDER, A. M., M. S.,	East Andover
PRES. WILLIAM D. GIBBS, D. Sc., <i>ex officio,</i>	Durham

### THE STATION STAFF.

E. DWIGHT SANDERSON, B. S., B. S. Agr., *Director and Entomologist.*

FRED W. MORSE, M. S., *Vice-Director and Chemist.*

FREDERICK W. TAYLOR, B. Sc. (Agr.), *Agriculturist.*

CHARLES BROOKS, PH. D., *Botanist.*

FRED RASMUSSEN, B. S. A., *Dairyman.*

WILLIAM H. PEW, B. Sc. (Agr.), *Animal Husbandman.*

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ISAAC M. LEWIS, A. B., A. M., *Assistant Botanist.*

DAVID LUMSDEN, *Assistant in Floriculture.*

JOHN C. McNUTT, B. S. (Agr.), *Herdsmen.*

NELLIE F. WHITEHEAD, *Purchasing Agent.*

MABEL H. MEHAFFEY, *Stenographer.*

LAVINIA BROWN, *Bookkeeper.*

### FOUNDATION AND ENDOWMENT.

The New Hampshire College of Agriculture and the Mechanic Arts was incorporated by the state legislature in 1866, under the

provisions of the act of Congress, approved July 2, 1862, entitled "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts," the grant of land having been accepted by an act of legislature, approved July 9, 1863.

The act of 1862 provides that the income from the investment of the money realized from the sale of the lands shall be appropriated "to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, \* \* \* in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

The "Morrill Bill," which was approved August 30, 1890, and received the assent of the state by an act of legislature, approved February 13, 1891, provides an appropriation for the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of "the act of 1862."

The appropriation under the Morrill act is "to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction."

Under an act of Congress approved March 2, 1887, which received legislative assent August 4, 1887, was established that department of the college known as the Agricultural Experiment Station, the purpose of which was "to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

Benjamin Thompson, who died January 30, 1890, was a resident of Durham, and a farmer by profession. He had at heart the agricultural interests of his native state, and in the furtherance of those interests he bequeathed to it at his death his whole estate with a few minor reservations.

Mr. Thompson's final statement of the object of his bequest was as follows: "My object being mainly to promote the improvement of agriculture, though willing that the college to be established should also provide for the mechanic arts, it is my

will that the institution to be established by the state \* \* \* shall be called and designated \* \* \* The New Hampshire College of Agriculture and the Mechanic Arts, if that shall be the wish of the state; and that in addition to the instruction to be given therein, as provided by my said will, there shall be taught only such other arts or sciences as may be necessary to enable said state to fully avail itself of said donation of lands by the government in good faith, which two branches of instruction shall be the leading objects of said institution or college."

By the provisions of the will, the income from this source will not, however, become available until 1910. This endowment will amount at that time to nearly \$800,000, the annual income from which will be about \$32,000.

The state legislature accepted the Thompson bequest March 5, 1891, and on April 10, of the same year appropriated \$100,000 for buildings. Approximately \$50,000 was realized from the sale of property and from other sources. In 1893 an additional appropriation of \$35,000 was made by the state for completing and furnishing the buildings. Accordingly, in 1893 the college was moved from its first home at Hanover to its present location at Durham.

The general government of the college is vested in a board of thirteen trustees. The governor of the state and the president of the college are trustees, *ex officio*; the alumni of the college elect one trustee; and all other trustees are appointed by the governor of the state, with the advice and consent of the council.

The college is executing the trust reposed in it by giving instruction in the various courses described in this catalog, under the prescribed heads of "agriculture" and "the mechanic arts."

## SITUATION.

Durham, the present site of the college, is on the Western Division of the Boston and Maine Railroad, 62 miles from Boston, and about midway between Rockingham Junction and the City of Dover, being five miles from the latter place.

## SUNDAY SERVICES.

Although the only church in Durham is nominally Congregational, it is attended by citizens of all denominations, and sectarian lines are never drawn. It is conveniently situated, and offers ample opportunity for religious observance.

## GENERAL INFORMATION.

New Hampshire College offers the following courses:

1. Agricultural courses.
  - a. Four year course.
  - b. Two year course.
  - c. Ten week course.
2. Mechanical Engineering Course.
3. Electrical Engineering Course.
4. Chemical Engineering Course.
5. General Course.

The college is a part of the public school system of the state. It stands in its agricultural, mechanical engineering, electrical engineering, technical chemistry, and general scientific courses, in the same relation to the high schools that the high schools stand to the grammar schools, and that these in turn stand to the elementary schools. In other words, it is a continuation of the grades of the public school system of the state, with special reference to the industrial pursuits, and, in the courses that are provided as described elsewhere in this catalog, it aims to give a practical training that shall fit the student to deal with the problems of life.

## TUITION AND FEES.

Tuition is \$60 a year; fees, which include all charges commonly considered extras, except those for breakage and damage to college property, are \$20 a year. They are payable in advance in two equal instalments, one on the first day of each semester.

## SCHOLARSHIPS.

Scholarships are awarded each semester at the discretion of the faculty to resident students of New Hampshire. They may be forfeited at any time for misconduct and will not be awarded except by special permission of the president, to students in the four year courses who have failed to secure an average grade of seventy or over in the previous semester. They are given for the purpose of aiding deserving students and will be withdrawn from those who use intoxicating liquors or tobacco.

*Conant Scholarships.*—There are twenty-five Conant scholarships, each paying tuition, \$60, fees, \$20, cash, \$20,—total, \$100. These are assigned under the following conditions:

They are to be given to young men taking an agricultural course.

Each town in Cheshire County is entitled to one scholarship, and Jaffrey is entitled to two.

They will be reserved for their respective towns until August 1 of each year. Those not taken by students from Cheshire County, and those in excess of the number of towns, will then be assigned to agricultural students from other parts of the state, and may be divided at the discretion of the president.

*Senatorial Scholarships.*—There are twenty-four senatorial scholarships,—one for each senatorial district. Each scholarship is to pay tuition, \$60. Senatorial scholarships not filled may be assigned to students from other localities at the discretion of the faculty; they are open to students in all courses.

*Grange Scholarships.*—Each subordinate and Pomona grange in New Hampshire has the privilege of appointing one student annually to a free scholarship in any of the four year or two year courses in the college. Each scholarship is to pay the tuition of \$60.

The method of appointment is entirely at the option of the grange; it may be by election, competitive examination, or otherwise. Holders of these scholarships need not be members of the grange.

*Valentine Smith Scholarships.*—Through the generosity of the late Mr. Hamilton Smith of Durham, the sum of \$10,000 has been given to the college to establish the Valentine Smith scholarships.

"The income thus accruing to the college shall be given to the graduate of an approved high school or academy who shall, upon examination, be judged to have the most thorough preparation for admission to the college; *provided*,

"That the income shall be paid to the student to whom it is awarded, in eight semi-annual payments, at the time appointed for the payment of term bills; and

"That if the student receiving this scholarship shall at any time prove unworthy, in the judgment of the faculty, by reason of defective scholarship or character, he shall forfeit his claim to the student most deserving; and

"That if the student receiving this scholarship shall cease to be a member of the college, the income from this fund, for the unexpired term, shall be awarded to the student most deserving in character and scholarship."



By vote of the faculty, these scholarships will be forfeited by failure to obtain an average grade of 75 per cent. for any semester.

These scholarships yield \$400 annually or one hundred dollars to each holder.

Competitive examinations for this scholarship will be held at the college at the time of the entrance examinations in September, and at no other time. They are not restricted to residents of New Hampshire.

### PRIZES.

*Bailey Prize.*—Dr. C. H. Bailey, of Gardner, Mass., and E. A. Bailey, B. S., of Keene, N. H., offer a prize of ten dollars for proficiency in chemistry.

*Erskine Mason Memorial Prize.*—Mrs. Erskine Mason of Stamford, Conn., has invested one hundred dollars as a memorial to her son, a member of the class of 1893, the income of which is to be given, for the present, to that member of the senior class who has made the greatest improvement during his course.

### COLLEGE AID TO STUDENTS.

Students obtain considerable financial aid by janitorships, and work on the farm and in the greenhouse. They also find employment with the power and service department of the college and with the experiment station.

### ESTIMATE OF FRESHMAN EXPENSES.

Tuition,	Free	\$60.00
Text-books,	\$10.00 to	25.00
Military uniform for new students,	16.00 to	16.00
Drawing instruments and materials,	10.00 to	25.00
Fees,	20.00 to	20.00
Room rent, including heat and light,	30.00 to	50.00
Board, \$3 to \$3.50 per week, for thirty-six weeks,	108.00 to	126.50
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Total,	\$194.00	\$322.50

Room rent is estimated on the supposition that two students occupy the same room or suite of rooms.

The college has no rooms for men students. Rooms may be obtained either furnished or unfurnished, in buildings under private control, and are for the most part provided with heating apparatus, electric lights and baths.

Women students, unless living at home, are required to room in Smith Hall, the woman's dormitory. Circulars giving terms, etc., may be obtained from the Registrar, New Hampshire College, Durham, New Hampshire.

### REGISTRATION.

All undergraduate students who desire to attend the college during a given semester are required to register at the registrar's office before 4 p. m. of the first day of such semester. Every former student registered after the first day of any semester shall be charged for such registration a fine of one dollar for the first day and fifty cents additional for each succeeding day, to be remitted only by the president upon presentation of a substantial excuse for the delay.

### ELECTION OF STUDIES.

Every student shall, on or before the Saturday before the last in each semester, notify in writing the secretary of the faculty of his elections for the semester following. Any student who, having made his elections, desires to change, shall make application to the faculty in writing with a statement in full of his reasons.

Any student who fails to fill out his elective slip on or before the date mentioned shall pay a fine of one dollar before he can be registered for the studies of the next semester, unless he has previously obtained from the secretary of the faculty a written excuse for delay.

No student shall be permitted to make changes in courses elected by him after one week from the time of his registration in each semester, except by vote of the faculty and the payment of one dollar.

### ATTENDANCE AND EXCUSES.

All male students, unless members of the senior class or physically unfit, are required to attend military drill.

All students are required to attend chapel exercises. Students accumulating more than six unexcused absences from chapel during any semester shall be placed on probation.

Attendance upon class work is, in general, under the control of the heads of departments concerned. However, excuses for absence for one day or more, may be obtained of the dean in advance, and should be passed to the registrar by the student not later than twenty-four hours after the termination of such



absence. Excuses for absence for less than one day should be obtained of the instructors concerned. If excuses are for an indefinite time, the student must report to the registrar within twenty-four hours after his return to his studies, if he wishes to receive credit for his excuses.

In no case will such excuse relieve the student from class work.

Any head of a department may, without faculty action, exclude from examination any student who has been absent from twenty per cent. of the exercises of any class under his charge.

All classes shall begin at seven minutes after the hour scheduled, and close promptly at the end of the hour.

#### AMOUNT OF WORK.

No student shall be permitted to carry less than sixteen or more than twenty-two credit hours per week of classroom work or its equivalent, without the consent of the faculty.

#### REMOVAL OF DEFICIENCIES BY EXAMINATION.

Students conditioned on entrance examinations may have an opportunity to make up such deficiencies upon the three days preceding the beginning of each semester, and upon the last Saturday of each semester. A student who takes a deficiency examination upon an entrance subject at any other time must pay the college one dollar for each examination upon each subject.

Students who have any entrance condition outstanding at the beginning of the third year of residence at the college or more than one at the beginning of the second year shall not be allowed to register until such conditions have been removed.

Dates for re-examination in conditioned subjects are fixed at the discretion of the instructor. No requests for examinations will be granted on less than two weeks' notice except on the regular dates for examinations in entrance deficiencies.

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### BUILDINGS.

#### THOMPSON HALL.

Thompson Hall, the main college building has a length of 128 feet, exclusive of a *porte-cochère* 40 feet long, and a width of 93 feet in the widest part. It is built of granite and brick, and has three stories besides the basement.

The basement contains a blower-room, with apparatus for controlling the heating and ventilation of the building, a geological laboratory, a lavatory, and storage rooms.

One half of the first floor is occupied by the mechanical and free hand drawing and machine design rooms. The remainder of the first floor is used for offices, recitation rooms for mathematics and history, and a waiting room for women.

On the second floor are more offices, the zoological laboratories and recitation rooms for biology, mechanical engineering, English and modern languages.

On the third floor are the large hall used as an auditorium, two society rooms, and the bell-boy's room.

The building is lighted by gas and electricity, and provided with the most approved system of heating and ventilation.

#### LIBRARY BUILDING.

The library building, completed this year, was made possible by the generosity of Mr. Andrew Carnegie and by an act of consolidation whereby the college assumed the care of the Durham libraries and added to its building fund a sum of money which Mr. Hamilton Smith, late of Durham, provided for a public library building. It is a two-story building, with a frontage of 75 feet and a depth of 65 feet, not including the stack extension, which gives shelving room for sixty thousand volumes. On the main floor are the delivery, reference, reading, and children's rooms and the librarian's office. The second floor is used for seminar and lecture rooms. The stack room is fitted with a three-story stack, the second floor being on a level with the main floor of the library.

#### MORRILL HALL.

This building was erected in 1902 at a cost of about \$30,000. It is 110 feet long and 58 feet wide, comprising four stories, including the basement. The material is brick, laid in Flemish bond, with trimmings of the clear, almost white Suncook granite. The roof is of slate, and the construction throughout is designed to give the greatest possible security against fire. All the partition walls are of brick, and the steam for heating is taken from the boilers at the central station, near the mechanical building.

The basement contains an agricultural museum, a live stock judging room, a bulletin mailing room, and a soil storage room.

The first floor is occupied by the department of agriculture. It contains two class rooms—one for agronomy and one for ani-

mal industry—a soil physics laboratory with a preparation room attached, and offices. The agricultural experiment station library of over 1,000 volumes and the office of the director of the agricultural experiment station are also on this floor.

The second floor is occupied by the horticultural department. It contains one class-room, a pomological laboratory, a forestry laboratory, a herbarium room, a horticultural and agricultural reading-room and offices. The second floor is also provided with a refrigerator room, in which the fruits and vegetables used for laboratory work may be preserved.

#### CONANT HALL.

Conant Hall contains the laboratories and lecture-rooms for instruction in chemistry, physics and electrical engineering. It is a substantial brick building, 92 by 70 feet, and three stories high, including the basement. It is heated by steam brought from the shops, lighted by gas and electricity and provided with a system of thorough ventilation. Water, gas, high pressure steam, hydrogen, oxygen, vacuum and blast are supplied through pipes wherever needed, and the lecture rooms in addition have switches controlling both dynamo and battery currents, and arrangements for stereopticon illustration.

The basement contains a small workshop, the battery, photometer, photographic and comparator rooms, a clock room protected by double walls against changes in temperature, an acid room and a water and gas laboratory provided with the necessary fixtures and appliances.

The first floor, with the exception of one room, is occupied by the departments of physics and electrical engineering. It contains the mineralogical laboratory, which is provided with tile-covered desks and other facilities for blowpipe analysis; the junior physical laboratory; an apparatus room; the department libraries of physical and electrical books and periodicals; an electrical laboratory; and the physical lecture room.

The second floor is given up entirely to the chemical department. It contains storerooms, an organic laboratory, a qualitative laboratory, a private laboratory, a dark room for polariscopic and spectroscopic work, a lecture-room provided with facilities as before described, a quantitative laboratory, and a room for the delicate chemical balances and most important reference works.

The laboratories are fitted up with modern accessories and with special reference to the kind of work to be performed in each.

### SHOPS.

These have been built in order to provide facilities for instruction in the working of wood and metals. The buildings are constructed on the "slow burning" principle, with thick walls, and heavy, continuous plank floors.

The main building is 42 by 106 feet, and two stories high, with a basement 31 by 42 feet. The basement and westerly rooms are used as an engine room and mechanical laboratories. On the first floor is the machine shop and on the second are the wood shop and stock and pattern room.

Joined to the main shop building and on a level with its basement is a one-story building, 40 by 100 feet, containing the boiler room, forge shop and foundry.

There are three boilers, aggregating 360 horse-power, which furnish steam to all the college buildings, wherever needed for heating or power. A brick chimney, 95 feet high, carries away the waste gases from the furnaces.

### THE ARMORY.

The armory is a brick building with granite trimmings, 61 by 99 feet, with a headhouse, 31 by 46 feet. In the basement are two bathrooms, containing shower baths, one for the use of the faculty and visiting teams, and the other for students. Adjoining these are a locker room, a drying room, a toilet room and a room for gymnasium supplies. There is also a space reserved for a swimming pool, bowling alley, ball cage, etc., to be completed at some future time.

On the first floor are the military lecture room, three offices and the drill hall or gymnasium, with a running track six feet wide.

The equipment of the gymnasium includes chest weights, dumb bells, Indian clubs, wands, bucks, horses, horizontal and parallel bars, travelling rings, ladders, punching bags, etc.

On the second floor of the headhouse are the college club rooms.

### NESMITH HALL.

Nesmith Hall, a two-story brick building, is occupied by the chemical, botanical and dairy departments of the agricultural experiment station. It contains the offices, libraries and laboratories of the chemical and botanical departments and the office of the dairy department. The recitation room of the botanical department is also in this building.

### DAIRY.

The dairy building is a wooden structure of one and one-half stories, with basement. It contains six rooms equipped for manual training in milk testing, milk and cream pasteurizing, cream ripening, butter-making and the care and management of dairy machinery.

The first floor is used for receiving milk and for the separators. On this floor are also the office of the associate professor of dairying and the laboratory for milk testing. The basement contains the ripening vats, churns and refrigerators, together with the engine.

### BARN.

The dairy barn is a large wooden structure, 45 by 100 feet, two stories high, and with a basement in which are box stalls, calf and sheep pens, a cold storage room, root cellar, feed, dressing and milk rooms. A story and a half ell, 35 by 100 feet, with basement, is attached to the main structure. The first floor of the ell is on a level with the basement of the main barn and contains stalls to accommodate 56 head of cattle. The basement of the ell contains pig pens, while the loft is used for the storage of feed, fertilizers and machinery. With the exception of the space occupied by a granary, a 120-ton silo and a 12-foot driveway, the upper floors of the main barn are used entirely for hay and forage, there being capacity for about 175 tons.

A new sheep barn built in the summer of 1907, houses about 80 sheep; the pens being sub-divided to accommodate those of different sizes. In this barn is storage room for twenty tons of hay and a considerable amount of grain.

A third barn is used by the agricultural department for the storage of hay, implements and wagons and for stabling the department horses.

A fourth barn, 25 by 60 feet, is used by the horticultural department for its horses and wagons and the storage of spraying machines and various garden implements.

### GREENHOUSES.

The new range of greenhouses has been specially planned and built for carrying on modern and up-to-date work in greenhouse management and handicraft. There are seven houses, besides a propagating hallway. Connected with the glass structure is a workroom, 20 by 30 feet, which also answers as an office for the



florist, and is equipped with scales, seed-boxes and other accessories. The basement of the workroom, or potting house, is used for a boiler room and storeroom for potting soils. The whole is heated by steam and the houses are piped so that the temperature may be regulated for any kind of crop. One house is equipped for greenhouse management instruction and each student is given definite laboratory space and prescribed work. Two of the houses have ground beds and are adapted for forcing vegetables. The remaining houses have raised beds, excepting the center of the palm house, which has a ground bed.

These houses are lighted with electricity and offer unusual facilities for instruction and experimentation.

### SMITH HALL.

Smith Hall, the woman's dormitory was made possible by the generosity of Mrs. Shirley Onderdonk, of Durham, who gave sixteen thousand dollars as a memorial to her mother, Mrs. Alice Hamilton Smith. The balance of the cost, \$10,000, was provided by the state.

It is a three and one-half story brick building, 86 feet long by 36 feet deep, built in "Old English" style, with granite trimmings and gable roof. The main entrance faces the south and opens into a large hall-way.

On the right of the entrance is the dining room and to the left a handsome reception room. In the rear of the reception room are the office and apartments of the matron; back of the dining room are the serving room, kitchen and pantry. In the basement are the boiler room, trunk room, drying room, laundry, and rooms for storage and fuel. The second and third floors are for student accommodations, each floor being equipped to accommodate sixteen students, and provided with toilet rooms and baths (shower and tub).

The building is heated by steam and lighted by electricity. The interior finish is of stained cypress, with hard wood floors.

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## LABORATORIES AND EQUIPMENT.

### AGRONOMY.

This department is provided with a collection of dried specimens of the different forage crops; the more important varieties of corn, wheat and oats; and with a large number of lantern

slides, grass charts and other illustrative material. The soil physics laboratory is equipped with soil bins, a compacting machine, chemical and torsion balances, and various kinds of physical apparatus for the study of soils, including that for the determination of specific gravity and for the making of mechanical analyses.

The agricultural museum contains many of the latest models of the different makes of farm machinery, tools and appliances, including plows, cultivators, harrows, mowers, rakes, corn and grain binders, threshers, manure spreaders, different kinds of cattle ties and various makes of patent wire fences.

The college farm, with its 300 acres of land, has a variety of soils and soil conditions suited to the growth of nearly all the important farm crops, and thus offers excellent opportunities for practical work and demonstration in the department of agronomy.

#### ANIMAL HUSBANDRY.

For the various courses in animal husbandry an extended use is made of the live stock of the college farm. The dairy herd consists of representative animals of the following breeds: Ayrshires, Guernseys, Jerseys, Holsteins and Shorthorns. The college owns seven head of horses representing the draft type, and to become acquainted with the standard bred types the students are taken to various stock farms where these types may be inspected and judged.

For the study of the different breeds of sheep and swine the experiment station flocks of pure bred Southdowns, Dorset Horns, Shropshires, Hampshires, Lincolns and Merinos and herds of Yorkshires are used.

In the agricultural building a large room is fitted up for the judging of live stock; instruments for precise measurements are provided and score cards with a scale of points for each kind of animal are used.

The class-room is provided with a stereopticon lantern and a large collection of lantern slides is used to show the leading individuals of several breeds of live stock. The herd books of the several breeds are made use of in familiarizing the student with methods of tracing pedigrees and the practices of breeders' associations.

#### HORTICULTURE.

The facilities for instruction in the various lines of horticulture have vastly improved during the past few years.



The lecture room is fitted up with a stereopticon lantern and the collection of lantern slides is being continually enlarged. The pomological and vegetable gardening laboratories are of original design and offer every facility for modern work. A great many varieties of vegetables are grown in the experiment station trial ground, and these offer exceptional opportunities for identification and study in the laboratory for some time after field conditions have gone by. The orchards, gardens and grounds also offer opportunities for demonstrating the theories advocated in the lecture-room. Many varieties of different kinds of fruit are to be found in the orchards. Grapes, apples, cherries and small fruits are also grown at the agricultural experiment station. Propagation of fruits, shrubs and flowering plants is practised. A fine collection of Vilmorin charts is owned by the department.

#### COLLEGE FOREST.

A tract of 60 acres of old forest growth is owned by the college. It is located close at hand and offers ample opportunities for studying forestry. The country about Durham presents forestry conditions typical of New England, and the transplanting of trees, sowing of seeds and general questions of forestry management may here be studied in Nature's laboratory.

#### DAIRYING.

All available space in the dairy building is filled with various forms of cream separators, churns, testing apparatus and other dairy appliances. In addition to the product of the college herd, milk is received from about 25 farms in Durham and vicinity. Through this arrangement the college is able to furnish plenty of milk for practice work and to provide for a most thorough and practical training in dairy and creamery management.

#### MECHANICAL ENGINEERING.

A 40 horse-power engine furnishes power for the shops and electric lights for the college buildings. A large compound duplex pump receives water under a head of 15 feet through an eight-inch pipe from a reservoir one-half mile distant, and forces it through underground mains to the various hydrants and buildings or through nozzles for measurements during tests. It is fitted with indicator motions and other necessary equipment for complete duty tests. The pump with its long supply pipe, a 10-inch standpipe and a 6000-gallon tank, furnish apparatus for an extensive series of hydraulic experiments.

Among other apparatus is a 50,000-pound Olsen machine with the necessary tools and measuring instruments for tension compression and transverse tests; a 12 horse-power gas engine; a Westinghouse air-brake pump with locomotive and tender attachments; steam and gas engine indicators; a surface condenser; a Bristol pyromoter; Pitot tubes; differential gauges; cement testing machine with the necessary sieves and other apparatus for testing cement according to the recommendations of the committee for cement testing; and the usual supply of scales, gauges, thermometers and small apparatus. The three 66" return tubular boilers, with the 95 foot brick stack are used for boiler tests and flue gas analysis, by means of the Orsat apparatus, pyrometers and thermometers reading to 1,000 F. The boilers are fitted with forced draught apparatus, thus giving an opportunity for commercial tests with different grades of fuel, especially the cheaper grades. The ventilating fans and engines of the various buildings as well as the engines at the creamery, electrical laboratory and barn are available for testing. Opportunity is not only given for the student to test the engine or machine but to become familiar with its construction and operation.

In addition to the instruction given in the laboratory, excursions are made to various outside power plants, and when practicable, tests are made, thus enabling the student to become familiar with various types of engineering practice. Each year the proprietors of a nearby mill allow the class in valve gears to take exercises in valve setting on their 50 horse-power Corliss engine.

### SHOPWORK.

The course in wood work consists of practice in carpentry, joinery and turning. Following this work is the course in pattern making, special attention being given to methods of design. The shop is supplied with benches and the necessary tools to accommodate twenty students at one time. Other equipment consists of a circular saw, board-planer, buzz-planer, jig-saw, speed-lathes, a large pattern maker's lathe with molding and boring attachments.

In the machine shop the student learns the principles of turning, facing, thread cutting, milling, shaping, scraping, filing and planing. In the advanced courses, parts of machinery are made to be used in the shops. The equipment is as follows: seven engine lathes, a 14-inch by 6-foot speed-lathe, built by students; a vertical drill, built by students; a 30-inch Flather

planer; a universal milling machine with gear-cutting and spiral attachments; shaper, power hack saw; tool grinder; 12 benches with vises, and a large number of small tools, including micrometer, calipers and gauges necessary for accurate work.

In the forge shop are 18 Sturtevant down-draft forges with anvils and necessary tools. The blast to the forges is furnished by a No. 4 blower, and the smoke carried away by a 60-inch exhauster. These are driven by a small steam engine. The student is taught the principles of forging, welding and tempering of iron and steel. Special attention is given to accuracy of dimensions as well as to shape and finish.

Foundry work is taken in connection with the course in pattern making, and the student molds and casts from the patterns he has constructed in the wood-shop. Castings are made in iron, brass and alloy, and tests are made on "test bars" of each. The foundry is supplied with a furnace, molding benches and bench tools.

### PHYSICS.

The physical laboratory has a collection of the usual apparatus for laboratory work and lecture-room illustration, to which will be continually added pieces purchased or made in the college shop.

In the junior laboratory of physics there has been added apparatus for studying absorption phenomena and the comparison of spectra of films, liquids, metals, etc.; for measuring the angles of crystals and indices of refraction; for verifying the laws of refraction and total reflection of light; for determining the moment of inertia of various forms of specimens.

In electricity and magnetism the equipment includes instruments such as a magnetometer for studying the intensity of the earth's magnetism; a universal tangent galvanometer and an assortment of ammeters and voltmeters for measuring direct and alternating currents and voltages.

### ELECTRICAL ENGINEERING.

The electrical engineering laboratories consist of two dynamo rooms, a transformer room, a photometer room and a storage battery room. In the main dynamo room there is a large distributing switchboard on which are mounted instruments, switches and plugging devices so arranged that it is possible to connect the laboratory rooms, also each lecture room, and convey thereto direct current and single phase, two phase and three phase alternating currents.

The general equipment of this department includes a magnetometer for studying the intensity of the earth's magnetism; a universal tangent galvanometer; a high grade four spool Thomson reflecting galvanometer; a D'Arsonal galvanometer; a Ryan electrometer for tracing pressure and current waves; a standard ballistic galvanometer; an Ayrton and Perry's variable standard of self-induction; as well as other types of instruments of various sizes for elementary work; also a complete Queen's photometer equipment for comparing incandescent and arc lamps and the distribution of light from the latter for open, enclosed and flaming arcs and when used with different forms of reflectors.

The equipment of the dynamo electric laboratory consists of 2 Edison bipolar 3 K. W. generators, an Edison bipolar 15 K. W. generator; a General Electric 4 pole 12 K. W. generator; a Crocker-Wheeler 3.5 K. W. generator, a Century 5 H. P. motor; a Westing house 5 H. P. motor with wound secondary; a Westinghouse 23 H. P. Junior type of engine; a Thompson-Houston 3 K. W. generator; two  $\frac{1}{4}$  H. P. direct current motors; a low potential testing unit, consisting of a universal alternator belted to a direct current motor and capable of adjustment to be driven from either the direct or alternating current side; a  $\frac{1}{2}$  K. W. special alternator arranged for single, two and three phase currents connected either star or mesh; a storage battery of 60 cells, of the Chloride type, with special switchboard; various sizes and types of transformers; standard makes of voltmeters and ammeters having wide ranges; wattmeters; power-factor meters; phase indicators; hysteresis testing apparatus of the Holden-Esterlin type; high tension transformers for testing commercial value of various insulating materials and insulators; and various other testing instruments.

In connection with this department, there is a work shop equipped with a 14" 8 foot bed, Flather engine lathe with a complete set of attachments; a good set of wood and metal working tools; also a small speed lathe for drilling and wood working purposes, a union combination saw with scroll, molding and boring attachments, a small hand-driven metal planer and sensitive drill. This shop and its equipment are of great value in thesis work and in making new apparatus.

#### CHEMISTRY.

The several chemical laboratories are modern in design, commodious and well equipped. Each is supplied with the latest forms of apparatus required for its particular work. Besides

all necessary glass and porcelain ware, this includes water baths, drying ovens, combustion, muffle and assay furnaces, platinum dishes and crucibles, polariscope, spectroscope, balances, lantern and other lecture appliances, etc.

#### ZOOLOGY.

The zoological laboratory is well supplied with aquaria, microscopes, dissecting tools, charts, reference books and collections. The latter include a representative display of the birds of New Hampshire, and a very large collection of the insects of the state arranged in glass-covered boxes.

#### BOTANY.

The botanical laboratory is supplied with a good herbarium, charts, microscopes and the other necessary appliances.

#### SURVEYING.

The surveying instruments are sufficient in number and of the most approved pattern.

#### DRAWING.

One-half of the entire first floor in Thompson Hall is devoted to the use of the drawing and machine design department. For free-hand model-drawing and for mathematical drawing there is a good supply of geometric models; and for free-hand industrial drawing the nucleus of a good collection exists, consisting of plaster casts of historic ornament, details of human form and antique sculpture, as well as vases and common objects. There is an excellent collection of working models and machines for machine drawing and various machines in other departments are available for this work.

There is a good working library connected with this department, including reference books in mechanical and free-hand drawing and elementary and machine design.

#### MUSEUM.

The museum had for a nucleus the collection made during the state geological survey. To this additions have been made from various sources. Specimens are being collected to illustrate the zoology of New Hampshire, and New Hampshire collectors and naturalists are invited to make the museum the permanent depository for their collections.



### LIBRARY.

In accordance with an act of consolidation between the libraries of Durham and the college, the books of the Durham Public Library and the college are all shelved in the new building. This consolidation makes an especially good collection, the scientific books of the college supplementing well the more popular books of the town library. The consolidated libraries number about 23,000 bound volumes and 7,000 pamphlets.

In the reading room are to be found the leading American and foreign periodicals, local papers and Boston and New York daily papers.

In the reference room are shelved about 2,000 bound volumes, which give good opportunity for reference and research work. There is also provision for the future in the second story rooms, which can be used for department libraries when the reference room proves inadequate.

Aside from the main library, each department has its department library of the more technical books and those which are of special use in the laboratories and work-shops.

### MILITARY DEPARTMENT.

This department is in charge of an officer of the United States regular army, detailed by the war department, as professor of military science and tactics. Military instruction, which is required by law, is both theoretical and practical, the latter largely from September to December 1 and from April 1 to June, the former having special reference to the duties of the line.

The organization is a battalion of three companies with a band, officered by cadets selected for character, soldierly bearing and efficiency. The federal government has furnished Krag-Jorgensen magazine rifles, model 1898, and equipment for 200 men. Attention is paid to rifle practice, the government supplying ample ammunition and target materials, and the college a good range, within four minutes' walk of the college buildings, with firing points at 200, 300 and 500 yards. The rolling country in the vicinity of the college furnishes the best opportunities for extended order drill and field exercises, the athletic field for close order drills and the new gymnasium or drill shed gives ample room for indoor work.

The cadets wear, whenever on military duty, and may at other times, provided the complete uniforms are worn, cadet gray uniforms with black trouser stripes, black braid on cuffs and col-

lars of blouses and blue caps, army regulation. The letters N. H. C. are embroidered in gold on each side of blouse collar. The cost of such a uniform does not exceed \$16 and the wearing of such does away with the necessity of purchasing a civilian suit for college use.

Service in this department is optional for members of the senior class; all other students, excepting those presenting surgeon's certificates of disability, are required to attend both drills and recitations. Seniors who elect drill and are appointed cadet officers have their college fees remitted.

Upon the graduation of each class, the names of such students as have shown special aptitude for military service are reported to the adjutant-general of the army and to the adjutant-general of the state. The names of the three most distinguished students in this department are inserted in the United States army register.

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## FOUR YEAR COURSES.

### AGRICULTURAL COURSE.

This course is arranged especially for the general education and scientific training of students to fit them in various economic branches, such as agronomy, animal husbandry, dairying, biology, agricultural chemistry, entomology, forestry, horticulture, veterinary science, etc. Graduates are qualified to take positions as teachers and assistants in colleges and experiment stations, as farm superintendents, foremen, stock raisers, dairy farmers, creamery managers, dairymen, superintendents of estates, parks or cemeteries, fruit-growers, gardeners, florists, nurserymen, landscape gardeners, foresters, poultrymen, ranchmen, etc.

The aim is to give a broad general foundation of pure and applied science. Laboratory methods are used in connection with lecture and recitation work. Seminary courses are also given, especially for seniors and advanced students.

### BIOLOGICAL DIVISION OF THE AGRICULTURAL COURSE.

The biological division of the agricultural course is for the benefit of those students who desire to make a special study of some phase of natural history. It leads to such positions as teachers of botany and zoology in high schools and colleges, entomologists for experiment stations, state inspectors of nursery grounds, etc. During the first two years the student pursues



the regular studies of the agricultural course, but in his junior year he begins to specialize in botany and zoology, a considerable proportion of his time during the rest of his course being given to these subjects. Students taking this course will elect, with the advice of the instructors in charge, six hours per week of biological work in the junior year and seven hours per week during the senior year, exclusive of thesis.

#### CHEMICAL DIVISION OF THE AGRICULTURAL COURSE.

The work of this division is especially intended to give a thorough grounding in the principles of chemistry as applied to agriculture and agricultural chemical analysis and to train the student thoroughly in all kinds of manipulation required of the chemist in experiment stations, large dairy establishments, fertilizer works, etc.

Instruction is given mainly by personal supervision in the laboratory, accompanied by lectures, themes, recitations; and, as in the course in technical chemistry, the studies are arranged to meet the needs of the individual. Students wishing to take this course will elect, with the advice of the instructors in charge, six hours per week of chemical work during the junior year, and seven hours per week during the senior year.

#### COURSE IN MECHANICAL ENGINEERING.

Mechanical engineering is concerned with the design, construction, care and operation of machinery.

The special studies are mathematical, including a large amount of drawing; technical, pertaining directly to the professional work of the engineer; and general.

The study of the scientific principles underlying the work of the engineer is accompanied throughout the course by actual practice in mechanical operations and scientific research, by training in the use of tools for working wood and metals, and by experimental tests and demonstrations in the mechanical, chemical and physical laboratories.

#### ELECTRICAL ENGINEERING COURSE.

The electrical engineering course is intended to meet the demands of a young man fitting himself for practical and professional engineering, in connection with the various applications of electricity.

By means of lectures, recitations and laboratory work, the subjects of the course are brought to the attention of the stu-

dent in such a manner as to emphasize not only the present needs of the practitioner and engineer, but to give him the groundwork that will enable him to grasp and understand the constantly increasing number of problems that require solution.

The instruction aims to impart a complete practical and theoretical knowledge of the best modern types of electrical machines and appliances and the methods of designing, building and operating them.

The rapid progress in recent years in applying electricity to commercial uses, renders it difficult, if not impossible, for one without a technical education to gain prominence in the work and be intrusted with its more responsible positions.

#### COURSE IN CHEMICAL ENGINEERING.

This course is intended to fit for the career of a professional chemist or chemical engineer, and to give a good foundation for original and independent chemical research.

Instruction is imparted by lectures, recitations and a large amount of carefully supervised laboratory work. The laboratory course is largely an individual one, and the work of each student is conducted with reference not only to the particular object he may have in view, but also to the acquirement of a broad knowledge of chemical science. The student is given a thorough training in German and French to enable him to read with ease the chemical literature; a thorough grounding in mathematics, necessary for advanced theoretical chemistry or chemical engineering; a somewhat limited amount of special engineering work, both mechanical and electrical; and a thorough undergraduate training in theoretical and applied chemistry. He is encouraged to develop the power of solving chemical problems by independent thought through the aid of the reference works and chemical periodicals which the library contains. Owing to the fact that the laboratories are becoming crowded the number of students taking this course is limited to six in each class. These six are chosen in the early part of the sophomore year from those who have applied. Fitness to become successful chemists will alone determine the choice made.

#### GENERAL COURSE.

The General Course is arranged for those who wish a broad general training based chiefly upon the study of science, modern languages and history. This course provides a liberal education with science as a leading element, and by means of the group

system of elective studies affords an opportunity for specialization.

### COURSES FOR WOMEN.

Women attending the college may elect any course laid down in the curriculum, subject to the conditions prescribed for all students. They may omit manual labor on the farm and in the shop, and substitute other studies.

The general course, with its electives, is specially prepared for women, and is so planned that special courses may be arranged in literature, languages, history, philosophy, pedagogy, drawing, biology and manual training.

The courses in agriculture and chemistry afford opportunities for the study of the natural sciences, and the engineering courses offer exceptional advantages in mathematics and physics.

### REQUIREMENTS FOR ADMISSION TO FOUR YEAR COURSES.

All candidates for admission to college must present satisfactory testimonials of good moral character.

Candidates for admission to the freshman class must offer studies amounting to a total of 14 units.

#### AGRICULTURAL COURSE.

Candidates for admission who intend to take the Agricultural Course must offer ten and one-half units from required subjects and three and one-half units from optional subjects, according to the following statement:

Required Group A (English) .....	3	units
B (American History or Ancient History) .....	1	unit
C.... (Algebra and Plane Geometry) .....	2½	units
D..... (Physics and Biology) .....	2	units
E..... (French or German) .....	2	units
	<hr/>	
	10½	units
(Optional) .....	3½	units
	<hr/>	
Total .....	14	units

## ENGINEERING COURSES.

Candidates for admission who intend to take the Engineering Courses must offer ten units from required subjects and four units from optional subjects, according to the following statement. Beginning with Sept. 1910, Plane Trigonometry will be added to the required subjects.

Required Group A (English) .....	3	units
B (American History or Ancient History) .....	1	unit
C (Algebra, Plane and Solid Geometry) .....	3	units
D..... (Physics)	1	unit
E..... (French or German)	2	units
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	10	units
(Optional)	4	units
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Total .....	14	units

## GENERAL COURSE.

Candidates for admission who intend to take the General Course must offer ten and one-half units from required subjects and three and one-half units from optional subjects, according to the following statement:

Required Group A (English) .....	3	units
B (American History and Ancient History) .....	2	units
C.... (Algebra and Plane Geometry)	2½	units
D..... (Physics)	1	unit
E..... (French or German)	2	units
	<hr/>	
	10½	units
(Optional)	3½	units
	<hr/>	
Total .....	14	units

## GROUP A, ENGLISH.

The New England College Entrance Requirements in reading and study or any course of equivalent value—four periods per week for four years. Emphasis should be placed upon the development of a clear, correct style on the part of the candidate rather than upon the critical analysis of literature.

## FOR 1909-1911.

## Required for Study and Practice.

Shakespeare: Macbeth. Milton: Lycidas, Comus, L'Allegro, and Il Penseroso. Burke: Speech on Conciliation with America; or Washington: Farewell Address, and Webster: First Bunker Hill Oration. Macaulay: Life of Johnson; or Carlyle: Essay on Burns.

## Required for Reading.

*Group 1 (two books to be selected).* Shakespeare: As You Like It, Henry V, Julius Cæsar, The Merchant of Venice, Twelfth Night.

*Group 2 (one book to be selected).* Bacon: Essays. Bunyan: The Pilgrim's Progress, Part I. The Sir Roger de Coverley Papers in "The Spectator." Franklin: Autobiography.

*Group 3 (one book to be selected).* Chaucer: Prologue. Spenser: Selections from the Faerie Queen. Pope: The Rape of the Lock. Goldsmith: The Deserted Village. Palgrave: Golden Treasury (First Series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

*Group 4 (two books to be selected).* Goldsmith: The Vicar of Wakefield. Scott: Ivanhoe, Quentin Durward. Hawthorne: The House of the Seven Gables. Thackeray: Henry Esmond. Gaskell: Cranford. Dickens: A Tale of Two Cities. George Eliot: Silas Marner. Blackmore: Lorna Doone.

*Group 5 (two books to be selected).* Irving: Sketch Book. Lamb: Essays of Elia. De Quincey: Joan of Arc and The English Mail-Coach. Carlyle: Heroes and Hero-Worship. Emerson: Essays (selected). Ruskin: Sesame and Lilies.

*Group 6 (two books to be selected).* Coleridge: The Ancient Mariner. Scott: The Lady of the Lake. Byron: Mazeppa and the Prisoner of Chillon. Palgrave: Golden Treasury (First Series), Book VI, with special attention to Wordsworth, Keats, and Shelley. Macaulay: Lays of Ancient Rome. Poe: Poems. Lowell: The Vision of Sir Launfal. Arnold: Sohrab and Rustum. Longfellow: The Courtship of Miles Standish. Tennyson: Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur. Browning: Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Phœdippides.



**GROUP B, HISTORY.**

The work offered for each unit in History must consist of at least five exercises per week during one year of the high school course, except that in the case of American History four exercises per week will be accepted. For details of preparatory work in History, reference is made to "A History Syllabus for Secondary Schools, by the New England History Teachers' Association." Boston, D. C. Heath & Co., 1904.

**American History and Civics.**

The History requirements are covered by Channing's Students' History, Montgomery's Students' History or by Hart's Essentials, with the collateral work. The work in Civics must include at least a knowledge of the Constitution of the United States.

—1 unit.

**Ancient History.**

Wolfson's Essentials or an equivalent, with the collateral work, or, the History of Greece and the History of Rome as given in works like Myers' History of Greece, Morey's Outlines of Greek History, Allen's Roman People, Myers' Rome and Morey's Outlines of Roman History. The requirements are limited to Grecian History and Roman History to A. D. 476.

—1 unit.

**English History.**

The amount of English History required is represented by Gardiner's Students' History, by Larned's or Montgomery's History, or by Walker's Essentials, with the collateral work.

—1 unit.

**Mediaeval and Modern History.**

Harding's Essentials of Mediæval and Modern History with the collateral work, or Myers' Mediæval and Modern History, or an equivalent.

—1 unit.

**GROUP C, MATHEMATICS.****Algebra.**

Through quadratic equations, including radicals and fractional and negative exponents, binomial theorem and progressions,—five periods per week for one and one-half years.

—1½ units.

**Plane Geometry.**

The equivalent of Wells' presentation.

—1 unit.

**Solid Geometry.**

The equivalent of Wells' presentation.

— $\frac{1}{2}$  unit.

**Plane Trigonometry.**

The equivalent of Wells' presentation.

— $\frac{1}{2}$  unit.

**GROUP D, SCIENCE.**

Accompanying the certificates for each of the sciences the student **MUST** present at entrance a note-book containing records and drawings of his or her observations and experiments in the laboratory, which must bear the certificate of the teacher in charge that the work was done personally in the laboratory.

**Physics.**

The preparation required for entrance in Physics shall be an equivalent of five exercises a week for one year, of which at least two are devoted to laboratory work.

—1 unit.

**Biology.**

Students in the Agricultural Course must present either.

**A. Zoology.**

Kellogg's Elementary Zoology, Linville and Kelly's Text book in General Zoology. Jordan, Kellogg and Heath's Animals, Needham's Lessons in Zoology, Coulton's Zoology, or an approved equivalent, occupying at least four periods per week for a half year, of which at least one is devoted to laboratory work.

— $\frac{1}{2}$  unit.

**and Botany.**

Bergen's Elements of Botany, or an approved equivalent, occupying at least four periods per week for a half year, of which at least one is devoted to laboratory work.

— $\frac{1}{2}$  unit.



or

B. Botany.

Coulter's Text Book of Botany, Bergen's Foundations of Botany, or an approved equivalent, occupying at least four periods per week for one year, of which at least one is devoted to laboratory work.

—1 unit.

Geology.

Leconte's Compend or an approved equivalent.

— $\frac{1}{2}$  unit.

Chemistry.

Elementary Inorganic Chemistry equivalent to the work covered in Remsen's Briefer Course, Storer & Lindsay's Manual, Witham's Elements or Newell's Descriptive Chemistry, accompanied in each instance with laboratory practice.

—1 unit.

GROUP E, MODERN LANGUAGES.

French.

Two years are required for preparation in French. Work of the first year should include (1) careful drill in pronunciation, (2) drill upon the rudiments of grammar, (3) abundant translation of simple English prose into idiomatic French, (4) reading of from 100 to 175 pages of French prose, (5) writing French from dictation. Work of the second year should include (1) the reading of from 250 to 400 pages of easy modern prose, (2) constant practice in translating from English into French variations of the text read, (3) frequent paraphrases of the text read, (4) dictation.

—2 units.

German.

Two years are required for preparation in German. Work of the first year should include (1) careful drill in pronunciation, (2) drill upon the rudiments of grammar, such as the inflection of the articles, the common nouns, adjectives, pronouns and strong and weak verbs, upon the uses of the prepositions, the modal auxiliaries and the rules of syntax and word order, (3) writing from dictation, (4) the reading of from 75 to 100 pages of prose, (5) translation from English into German. Work of

the second year should include (1) the reading of from 150 to 200 pages of prose, (2) constant practice in translating from English into French variations of the text read, (3) dictation, (4) continued drill upon the rudiments of grammar, (5) frequent paraphrases of the text read.

—2 units.

#### GROUP F, ANCIENT LANGUAGES.

Students entering from approved schools may receive credit in their certificates for the following work in Latin or Greek.

##### Latin.

Grammar and four books of Cæsar. Two year's work.

—2 units.

Vergil, six books.

Cicero, six orations.

—2 units.

##### Greek.

Books I and II of Xenophon's Anabasis, Books III and IV of the Anabasis or their equivalent in other Attic prose, and 1,500 lines of Homer.

—2 units.

#### CERTIFICATES.

In place of examinations, certificates will be received from approved preparatory schools, including all that have been approved by the superintendent of public instruction in New Hampshire. Approval of a school will be withdrawn whenever it appears that the work of the school does not reach the standard required by the college. No certificate will be accepted from a private tutor or instructor.

Certificates should meet the requirements IN FULL; in case of exceptions the candidate will be examined on any requirement not covered by the certificate. If the certificate makes ANY exception in the case of a student who has not regularly graduated from an approved school, the certificate will not be accepted, and the student will be examined on all the requirements.

Certificates will be accepted for that work only which has been done in the certifying school, or which is necessarily involved in the work done there; work done in the grammar school must not be certified unless reviewed in the high school.

Certificates must be made out on a blank furnished by the college, and should be mailed to the dean at the close of the school year.

### COMPLETE CERTIFICATES.

THE SIGNATURE OF THE PRINCIPAL IS TO BE AFFIXED TO THE GENERAL CERTIFICATE, AND TO THAT OF EACH DEPARTMENT IN WHICH THE WORK OF THE CANDIDATE IS CERTIFIED.

### PARTIAL CERTIFICATES.

In case the work of a graduate has not been up to certificate grade in one or more subjects, the principal is requested to sign the general certificate, crossing out the words "and that in my judgment he is prepared to enter at once upon the work of the freshman year." He is also requested to fill out the group certificates in full *except signature*, the signature being attached only to such as indicate certificate grade.

Divided certificates from two or more schools will be accepted when the preparatory work has been done in more than one institution.

Certificate forms will be furnished upon application.

Candidates for advanced standing are also examined in the studies that have been pursued by the class which they propose to enter.

Examinations will be given, in the subjects presented for admission, beginning Friday of the week preceding the opening of the college year. Candidates will present themselves with their credentials on the first day of the examinations. See Calendar.

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## REQUIREMENTS FOR GRADUATION FROM FOUR YEAR COURSES.

Those who complete a four year course or its equivalent will be recommended for the degree of Bachelor of Science. No equivalent course will be accepted which does not comply with all the following requirements:

1. The completion of all work common to the four year courses.
2. The completion of one hundred fifty-four credit hours.
3. The completion of all but ten or less credit hours in some one of the regular four year courses.

4. Approval by the faculty not earlier than June 1 preceding the year of graduation.

The regular work of the senior class, including the regular final examinations, is completed at 4 p. m. on the Tuesday of the week preceding commencement; and each member of the class may receive a statement of his standing at the office of the registrar at 2 p. m. on the next day, Wednesday.

All work required for graduation must be completed by 6 p. m. of the Saturday of the same week.

### THESIS.

A thesis upon some subject connected with the work of the course taken is required of every candidate for a degree. The subject together with a written approval of it by the head of the department within which it lies must be submitted to the president before the 15th day of December preceding graduation. The thesis shall be submitted to the head of the department concerned not later than the second Tuesday preceding commencement day. The thesis must be completed in typewritten and bound form and be in the hands of the department concerned before the Tuesday preceding commencement day. The thesis shall be typewritten or printed upon standard thesis paper eight and one-half by eleven inches, medium weight, neatly bound in black cloth and gilt-lettered on first cover with title, name of author, degree sought and year of graduation. This bound copy shall be filed and left with the college librarian.

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## FOUR YEAR COURSES.

### DESCRIPTION OF STUDIES.

#### AGRONOMY.

PROF. TAYLOR, MR. EASTMAN.

#### 1. Farm Equipment and Farm Crops.

Lectures and recitations upon the selection, planning and equipment of farms; fencing; drainage; farm wells; harvesting and tillage implements; silos and stable construction, etc. History, use and methods of culture of our various farm crops. Practical exercises in leveling and laying out of drains and in the preparation of farm and building plans. Judging and scoring the different varieties of grains and grasses. For Agricultural Juniors.

*Three exercises per week. 1st S.*

**2. Soils and Soil Physics.**

Lectures and recitations upon the formation, kinds and physical properties of soils; the movements and conservation of soil moisture; the relation of heat and air to soil; the nature and physical effects of tillage and fertilizers; laboratory work and experimentation with soils to show the physical effects of different conditions and texture. For Agricultural Juniors.

*Three exercises per week. 2nd S.*

**3. Soil Management and Fertility.**

An advanced course in soils for those who have shown a special aptitude in the preceding course. The processes of soil formation, the physics and chemistry of soils, soil classification and mapping and the principles of fertility will be discussed. The lecture work will be supplemented by laboratory and field experimentation. Elective for Agricultural Seniors.

*Three exercises per week. 1st S.*

**4. Manures and Fertilizers. Prof. Morse.**

course of lectures, themes and abstracts on the subject of plant food and its sources. Elective for Agricultural Seniors.

*Two exercises per week. 2nd S.*

**5. Agricultural Seminary. Prof. Taylor.**

This course consists of library and reference work and a study of current agricultural literature. Each student will prepare during the term a certain number of abstracts, reports of papers upon topics relating to agriculture. For Agricultural Seniors.

*Two exercises per week. 1st S.*

**6. Agricultural History and Economics. Prof. Taylor.**

Lectures and recitations upon the history of agriculture from early Egyptian to modern American; present agricultural methods and systems in various countries; the principles of economics as applied to the organization, equipment and operation of the farm; tenancy and land ownership; practical problems in farm management. For Agricultural Seniors. First nine weeks.

*Four exercises per week. 2nd S.*

**7. Farm Mechanics. Prof. Taylor.**

Lectures and recitations upon the principles of construction of farm buildings; barns and silos; construction and maintenance of country roads; principles of draft; farm motors and machinery.



Practical work in testing and comparisons of various makes and kinds of farm machinery. For Agricultural Seniors. Last eight weeks.

*Four exercises per week. 2nd S.*

### **ANIMAL HUSBANDRY.**

ASSOC. PROF. PEW, MR. MCNUTT.

#### **1. Breeds of Livestock.**

Lectures and recitations upon the origin, history, development, characteristics and adaptability of the different breeds of cattle, sheep, horses and swine. In the study of beef cattle, market conditions and requirements are considered. In the study of dairy cattle, milk and butter production are considered. In the study of sheep, mutton and wool requirements are considered, also the raising of early lambs.

In the study of horses, besides the origin, history and development of the breeds, market classifications are considered. In the study of swine, the influence of various feeds and of different methods of management as affecting types is considered. One afternoon each week is used for judging the different breeds. For Agricultural Sophomores.

*Three exercises per week. 1st S.*

#### **2. Principles of Breeding.**

Lectures and recitations upon the laws of heredity; value of selection in improving and maintaining a high standard of excellence in farm stock; variation, cause and extent; methods of breeding, including discussion of inbreeding, crossing and grading. Elective for Agricultural Seniors.

*Two exercises per week. 2nd S.*

#### **3. Stock Feeding.**

Lectures and recitations upon the laws of nutrition; composition and digestibility of feed stuffs; influence of feed on the animal body, preservation of coarse fodders; a study of leading cereals and by-products. Practice will be given in computing and compounding rations for various purposes. For Agricultural Juniors.

*Three exercises per week. 2nd S.*

#### **4. Veterinary Science.**

Lectures and recitations upon anatomy and physiology of the animal body; holding a post-mortem; simple farm medicines and

methods of administering; breeding and some of its effects; common farm operations; common infectious and contagious diseases affecting farm animals and methods of treatment. Elective for Agricultural Juniors.

*Three exercises per week. 2nd S.*

#### **5. Poultry.**

Lectures and recitations upon different classes and varieties of poultry; breeding and feeding; location and building of poultry houses; a study of incubators and brooders; methods of preventing disease. Practice will be given in scoring. Elective for Agricultural Seniors.

*Two exercises per week. 2nd S.*

#### **6. Advanced Livestock.**

This is a course laid out especially for those students who have shown proficiency in the previous courses having to do with Livestock. Special problems will be worked out as desired by the students concerning the breeds and their management; advanced live stock judging will also be given. Elective for Agricultural Juniors.

*Three exercises per week. 2nd S.*

#### **7. Animal Mechanics.**

Lectures and recitations upon the conformation, soundness and anatomy of the horse, the principles of mechanics involved as applied to the animal machine, proportions and conformation of horses for speed and draft; various gaits; practical exercises in measuring animals and testing value of given measurements for given purposes. Course to be given every other year beginning with 1905. Elective for Agricultural Seniors or Juniors.

*Four exercises per week. 1st S.*

### **BOTANY.**

PROF. BROOKS, MR. LEWIS.

#### **1. General Botany. Prof. Brooks, Mr. Lewis.**

Lectures and laboratory work on the fundamental principles of plant physiology, followed by the study of a series of representative cryptogams. For Agricultural Sophomores, elective for General Course Sophomores.

*Three exercises per week. 1st S.*



**2. General Botany.** Prof. Brooks, Mr. Lewis.

This course continues the work on type forms begun in Course 1 and includes the study of vascular cryptogams, gymnosperms and angiosperms. The latter part of the semester will be devoted to a study of plant families and plant societies as represented in the local flora. Lectures, laboratory and field work. For Agricultural Sophomores, elective for General Course Sophomores.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**3. Plant Pathology.** Prof. Brooks.

This course deals with the nature, cause and prevention of plant diseases and includes a systematic consideration of parasitic fungi. Lectures and laboratory work. Elective for Agricultural Juniors and General Course Juniors and Seniors.

*Open only to students who have completed Course 2.*

*Four exercises per week. 1st S.*

**4. Mycology.** Prof. Brooks.

A study of representative groups of fungi, including the bacteria; culture methods and pathological work with fungous diseases. Lectures, laboratory and field work. Elective for Agricultural Juniors and General Course Juniors and Seniors.

*Open only to students who have completed Course 2.*

*Three exercises per week. 2nd S.*

**5. Plant Physiology.** Prof. Brooks, Mr. Lewis.

Lectures and experimental work on absorption, nutrition, growth, respiration and irritability. Elective for Agricultural Juniors and General Course Juniors and Seniors.

*Open only to students who have completed Course 2.*

*Three exercises per week. 2nd S.*

**6. Plant Histology.** Mr. Lewis.

A minute study of plant cells and plant tissues, starches, aleurones and other cell contents; use of reagents and stains; cutting and mounting of sections. Lectures and laboratory work. Elective for General Course Juniors and Seniors and Agricultural Seniors.

*Open only to students who have completed Course 2.*

*Three exercises per week. 1st S.*

**7. 8. Advanced Botany.** Prof. Brooks, Mr. Lewis.

Opportunity to do original work along special lines will be offered to students who have shown special ability in the preceding courses.

*Three exercises per week throughout the year.*

**CHEMISTRY.**

ORGANIC CHEMISTRY—PROF. MORSE.

INORGANIC CHEMISTRY—PROF. PARSONS,

ASST. PROF. JAMES, DR. RANDALL.

**1. Inorganic Chemistry.**

Lectures and recitations on general and theoretical chemistry, illustrated by experiments, charts, specimens, lantern views, etc. Solution of chemical problems will be required. For all Freshmen.

*Three exercises per week. 1st S.*

**2. Inorganic Chemistry.**

Course 2 is a continuation of Course 1, but the time will be mainly spent on the metallic elements, their metallurgy, salts, etc.

*Open only to students who have completed Course 1.*

*Two exercises per week. 2nd S.*

**3. Elementary Physical Chemistry.**

A short elementary course of ten lectures on the Dissociation Theory and its application; the Mass Law, etc. To accompany Courses 2 and 4.

*Elective by special arrangement.*

**4. Qualitative Analysis.**

Course 4 consists of laboratory practice, with occasional lectures. The student is expected to become proficient in the separation and detection of the common acids and bases and to keep a full set of notes. He will have practice in the writing of reactions and will fill out numerous slips containing questions bearing upon his work. For Chemical Freshman, Electrical and Mechanical Freshmen (Division 1), Agricultural Sophomores and Electrical and Mechanical Sophomores (Division 2); elective for General Course Sophomores and Juniors.

*Open only to students who have completed Course 1.*

*Freshman Year. 2nd S.*

*Sophomore and Junior Years. 1st S.*

*Fifty-one exercises.*

**5. Qualitative Analysis.**

A short advanced course for Chemical Sophomores on insoluble substances and the rarer elements, to precede Chemistry 10. First five weeks.

*Twenty-five exercises. 1st S.*

**6. Organic Chemistry.** Prof. Morse.

Lectures and recitations. A study of the chemistry of the carbon compounds. For Agricultural and Chemical Sophomores, elective for General Course Juniors.

*Open only to students who have completed Chemistry 1 and 2.*

*Three exercises per week. 2nd S.*

**7. Chemistry of Plant and Animal Nutrition.** Mr. Morse.

Lectures and recitations on the composition of plants, animals and foods. For Agricultural and Chemical Juniors, elective for General Course Seniors.

*Open only to students who have completed Chemistry 6.*

*Two exercises per week. 1st S.*

**8. Organic Chemical Laboratory.** Prof. Morse.

The course consists mainly of laboratory practice in preparing and purifying organic compounds and a study of qualitative organic reactions and analyses. Lectures and recitations will be held from time to time in connection with the practice. For Chemical Juniors, elective for General Course Juniors.

*Three exercises per week. 1st S.*

**10. Quantitative Analysis.**

A preliminary course in quantitative analysis to familiarize the student with the general methods of chemical manipulation and analysis. For Chemical Sophomores. Elective in the General Course in Sophomore, Junior and Senior Years, provided laboratory facilities permit. Last twelve weeks.

*Open only to students who have completed Chemistry 4.*

*Five exercises per week. 1st S.*

**11. Quantitative Analysis.**

A continuation of Course 10. For Chemical Sophomores.

*Six exercises per week. 2nd S.*

**12. Advanced Quantitative Analysis.**

Course 12 is arranged for students of the Chemical Courses, and is intended to fit them for work in the laboratories of agri-

cultural experiment stations, fertilizer works, iron works, sugar refineries, etc., and for the duties of the public analyst. This course will be made to fit the end which each has in view, and will be largely an individual one. For those students desiring to specialize in agricultural and food chemistry the analysis made will tend in the main toward agricultural products, fertilizers, mucks, marls, manures, dairy products, waters, foodstuffs, sugars, etc. For the student wishing to enter metallurgical works, the analyses will be in the main upon iron and steel and other metals, ores, limestones, slags, alloys, fuels, etc. As a preparation for the study of medicine, work will be done on poisons, foods, drugs, urine, etc. Other lines will be arranged to meet the wants of the individual student. Each student will be given some practice in all of the branches of agricultural, metallurgical, medical, sanitary and industrial chemistry, in order to lay a foundation for any future work which may be required of him. A short course in gas and oil analysis will also be provided. For Chemical Juniors.

*Open only to students who have completed Course 11.*

*Five exercises per week. 1st S.*

### 13. Advanced Quantitative Analysis.

A continuation of Course 12. For Chemical Juniors.

*Four exercises per week. 2nd S.*

### 14. Industrial Chemistry.

Course 14 consists of lectures on chemical manufactures, such as sugar, sodium carbonate, fertilizers, sulphuric acid, glass, matches, paints, dyes, soaps, illuminating gas, petroleum, etc. The lectures will be illustrated by lantern views, and trips to the leading New England cities to examine important chemical manufactures will be taken as far as practicable. For Chemical Juniors and Seniors.

*Open only to students who have completed Courses 1 and 2.*

*Two exercises per week. 2nd S.*

### 15. Metallurgy.

Course 15 consists of lectures describing the processes employed in the smelting of ores of iron, lead, copper, zinc, silver, gold, etc., and upon the methods used in refining these metals. The lectures are illustrated by stereopticon and by specimens of metallurgical products. For Chemical Juniors or Seniors.

*Open only to students who have completed Courses 1 and 2.*

*One exercise per week. 2nd S.*

Courses 14 and 15 are given in alternate years with Course 22.

**16. Assaying.**

A course in the fire assay of gold and silver ores. For Chemical Seniors.

*Open only to students who have taken Courses 10 or 18.*

*Seventeen exercises. 1st S.*

**17. Agricultural Analysis.**

This course is arranged especially for students of the agricultural course, and consists mainly of the quantitative determination of the constituents of milk, butter, fertilizers, grain, etc. Elective, subject to desk room in laboratory.

*Open only to students who have completed creditably the work of Courses 1, 2, and 4.*

*Three exercises per week.*

**18. Metallurgical Analysis.**

This course is arranged for the students of the engineering departments who may elect the same, and consists mainly of the quantitative determination of ores, slags, metals, alloys, fuels, etc. Elective, subject to desk room in the laboratory.

*Open only to students who have completed creditably the work of Courses 1, 2, and 4 or 5.*

*Three exercises per week.*

**19. Chemical Journals, Methods, etc.**

The work consists of the study of current chemical literature, mainly in the German language, with recitations **twice a week**. Each student will be expected to prepare abstracts, reports, criticisms, etc., upon assigned articles. For Chemical Juniors.

*Open to students who have begun Course 11.*

*Two exercises per week. 1st S.*

**20. Chemical Journals.**

A continuation of Course 19. For Chemical Juniors.

*Two exercises per week. 2nd S.*

**21. Physical Chemistry, Lectures.**

The work consists of advanced study of chemical theory. Practical experiments will be performed, with the aid of the student, in the determination of vapor density, molecular weights, specific heat, etc.; and the study of isomorphism, diffusion of gases, solutions, ionization, electrolysis, molecular and atomic volume, thermo chemistry, equilibrium, the phase rule, etc., will take up

much of the time. For Chemical Juniors and Seniors. Course 21 comes in alternate years.

*Open only to students who have completed Courses 1, 2 and 10.*

*Two exercises per week. 1st S.*

## 22. Physical and Electro Chemistry, Lectures.

A continuation of Course 21, and is given in alternate years with Courses 14 and 15. For Chemical Juniors or Seniors.

*Three exercises per week. 2nd S.*

## 23. Chemical Research.

Especially arranged for students of the chemical engineering course. May merge at any time into 24 and will usually do so about the middle of the first semester. For Chemical Seniors.

*Eight exercises per week. 1st S.*

## 24. Thesis.

The work of the last semester of the chemical engineering course is given up to the special study of some selected subject in any branch of chemical science and the student is required to present a thesis showing him to be capable of independence of thought and manipulation. For Chemical Seniors.

*Eight exercises per week. 2nd S.*

## DAIRYING.

ASSOC. PROF. RASMUSSEN.

### 1. Farm Dairying.

Lectures and recitations on the Babcock test, tests for determining acidity in milk and on the use of the lactometer in detecting adulterations in milk. Includes also a study of the composition of milk, separation and churning. The laboratory work will be made applicable to farm conditions. For Agricultural Juniors.

*Four exercises per week. 1st S.*

### 2. Advanced Butter Making.

A study of the secretion, chemical and physical properties of milk, pasteurization, cream ripening, commercial starters, churning, marketing and scoring of butter. The laboratory work will be made applicable to factory conditions.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*



**3. Technology of Milk.**

Consists of a study of the uses of milk and its by-products outside the scope of butter and cheese making; the production and preparation of sanitary, certified, modified milk; the making of condensed milk and koumiss; the manufacture of casein and milk sugar, and the preparation of ices and ice cream. Elective for Agricultural Juniors and Seniors.

*Open only to students who have completed Course 1.*

*Two exercises per week. 2nd S.*

**4. Factory Management.**

This course is designed for students wishing to fit themselves for managers of large factories and other dairy establishments. It consists of a study of the organization, location, construction, and operation of factories; special problems connected with the manufacturing of butter; dairy conditions and methods in foreign countries.

*Open only to students who have completed Course 2.*

*Three exercises per week. 1st S.*

**5. Dairy Bacteriology and Cheese Making.**

Lectures and demonstrations on the function of bacteria and the application of bacteriological principles to dairy work.

A course of lectures will be given covering the details of the manufacturing, curing and marketing of the more important kinds of cheese.

*Open only to students who have completed Course 1.*

*Two exercises per week. 2nd S.*

**6. Dairy Research.**

A study of the work of the experiment stations and other dairy literature. Elective for Agricultural Seniors.

*Open only to students who have completed Courses 1, 2 or 3.*

*Two exercises per week. 1st S.*

**DRAWING.**

PROF. PUTNAM, MR. LATON.

These courses are of an industrial nature and include both freehand and mathematical branches of this subject.

**1. Industrial Drawing.** Prof. Putnam, Mr. Laton.

Free-hand lettering, free-hand drawing, use of instruments, mathematical drawing, inking, tinting, tracing and blue-prints.

Systems of object drawing; orthographic projection; isometric drawing; mechanical perspective, shades and shadows. For Ag-



ricultural and Engineering Freshmen, elective for General Course Freshmen.

Agricultural and General Course Freshmen.

*Two exercises per week. 1st S.*

Engineering Freshmen.

*Two and one-half exercises per week. 1st S.*

NOTE.—Alternating with shop-work on Wednesdays.

**2. Descriptive Geometry.** Prof. Putnam, Mr. Laton.

Recitations and drawing exercises in the solution of geometrical problems by orthographic projection.

For Engineering Freshmen. (Divisions 1 and 2.)

Division 1, whole semester.

*Three exercises per week. 2nd S.*

Division 2, first ten weeks.

*Two exercises per week. 2nd S.*

**3. Descriptive Geometry.** Prof. Putnam, Mr. Laton.

Continuation of 2. Practical problems on bridge beams, rafters, piping, etc.

For Engineering Freshmen (Division 2). Last seven weeks.

*Two exercises per week. 2nd S.*

**4. Design of Farm Buildings.** Prof. Putnam.

This course consists of drawings of floor plans and framing details for farm buildings in preparation for the Rural Architectural Course of the Senior Year. For Agricultural Freshmen.

*Two exercises per week. 2nd S.*

**5. Descriptive Geometry.** Prof. Putnam, Mr. Laton.

Same as Course 3. For Electrical and Mechanical Sophomores (Division 1). First seven weeks.

*Two and one-half exercises per week. 1st S.*

**6. Elementary Machine Drawing.** Mr. Laton.

Mechanism drawing; detail and assembly drawing of simple machines. For Electrical and Mechanical Sophomores.

Division 1, last ten weeks.

*Two exercises per week. 1st S.*

Division 2, whole semester.

*Two exercises per week. 1st S.*

**7. Elementary Machine Drawing and Free Hand Drawing of Chemical Apparatus.** Mr. Laton.

For Chemical Sophomores.

*Two exercises per week. 1st S.*

**8. Machine Drawing.** Mr. Laton.

Working drawings of various machines and machine tools including steam boiler and engine details. For Electrical and Mechanical Sophomores.

*Two and one-half exercises per week. 2nd S.*

NOTE.—Alternating with shop-work on Wednesdays.

**9. Free-Hand Drawing.** Prof. Putnam.

Light and shade drawing from casts and still life. Charcoal work. Elective for General Course Sophomores.

*Two exercises per week. 1st S.*

**10. Free-Hand Drawing.**

Wash drawings and water color work; pencil sketching from nature and exercises in perspective. Elective for General Course Sophomores.

*Two exercises per week. 2nd S.*

**11. Architectural Drawing.**

Studies of architectural detail and historic ornament. Elective for General Course Juniors.

*Three exercises per week. 1st S.*

**12. Architectural Drawing.**

Continuation of 11. The design of a building with details of ornament. Elective for General Course Juniors.

*Three exercises per week. 2nd S.*

**13. Advanced Architectural Drawing.**

Elective for General Course Seniors.

*Open only to students who have completed Courses 11 and 12.*

*Three exercises per week. 1st S.*

**14. Advanced Architectural Drawing.**

Elective for General Course Seniors.

*Open only to students who have completed Courses 11, 12 and 13.*

*Two exercises per week. 2nd S.*

**16. Free-hand or Charcoal Drawing.**

Elective for General Course Freshmen. Last seven weeks.

*Four exercises per week. 2nd S.*

**ELECTRICAL ENGINEERING.**

PROF. HEWITT, ASST. PROF. BUCK.

**1. Dynamo Electric Machinery.**

The course begins with a general study of both direct and alternating current dynamos and motors, including elementary theory, with a large number of practical problems to illustrate application of same. For Electrical and Mechanical Juniors.

*Open only to students who have completed Physics 2 and Mathematics 6.*

*Three exercises per week. 1st S.*

**2. Dynamo Electric Machinery.**

This course is a continuation of Course 1. It takes up the theory of armature winding and construction; the general points of design; a study of various types of electrical machinery; laboratory methods of measurements, the various electrical quantities such as electric motive force, current, resistance, permeability of iron, the use of standard instruments; the laws of electrolysis; thermo-electric currents, etc. For Electrical and Mechanical Juniors.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**4. Electrical Laboratory.**

This course consists of the measurement of resistances, inductances, the calibration of a ballistic galvanometer and Ryan electrometer, the permeabilities of samples of iron. Tests are made to determine the characteristic curves, efficiency curves, etc. The determination of the candle power of incandescent and arc lamps, the calibration of resistances, the measurement of power in alternating current circuits, alternator characteristics, the testing of synchro-

nous and polyphase motors, transformers, power measurements by wattmeters and a general study of polyphase machinery constitute the remainder of the course. For Electrical Juniors.

*Open only to students who have completed Course 1.*

*Two exercises per week. 2nd S.*

## 6. Telegraph and Telephone.

This course consists in a careful study of the elementary electrical principles of telegraphy; the construction and connection of lines, repeaters; high speed telegraphy; simple and multiplex telegraphy; submarine signalling; automatic devices, general electric signalling for purposes of alarms, railroads, etc., and wireless telegraphy; also a course of lectures and recitations on the acoustic and electrical principles of telephony; the different forms of calling and receiving apparatus and accessories and simple circuits. The last part of the course is devoted to the consideration of the more complex forms of circuits, exchange switchboards, transfer systems and the construction of overhead and underground systems. For Electrical Juniors.

*One exercise per week. 2nd S.*

## 11. Electrical Engineering Practice.

This course takes up the study of the properties of periodic curves; the effects of self-induction and capacity and a more detailed study of dynamos, motors, transformers and other electrical apparatus. For Electrical Seniors.

*Open only to students who have completed Course 2.*

*Three exercises per week. 1st S.*

## 12. Electrical Engineering Practice.

This course is a continuation and completion of Course 11. It takes up more advanced theory and general practice. It also includes a thorough study of High Tension Power Transmission and deals with the selection of apparatus for generating stations and the distributing systems. A study will be made of the proper combinations of apparatus to correctly represent standard theory and practice. The design of the transmission line and of the distributing systems will be considered. The application of the theory will be brought out in lectures and established with a large number of practical problems. A careful study will be

given to the various methods used for lightning protection. For Electrical Seniors.

*Open only to students who have completed Course 11.*

*Four exercises per week. 2nd S.*

### 13. Electric Railways.

In this course will be considered the principles which govern the application of electric motors to railway service, and the location of power and sub-stations as determined by economic questions. Following this will be given the practical points involved in the selection and operation of railway equipment including power and sub-station equipment, line and track, railway motors and car equipment, storage batteries, etc. The problem of utilizing electric energy in mining will also be considered. For Electrical Seniors.

*Open only to students who have completed Course 2.*

*Two exercises per week. 1st S.*

### 15. Electrical Laboratory.

This course is a continuation of Course 4 covering a more advanced series of experiments. A written report will be required for which one additional credit hour will be given. For Electrical Seniors.

*Open only to students who have completed Course 4.*

*Four exercises per week. 1st S.*

### 16. Electrical Laboratory.

This course is a continuation of Course 15 and takes up experiments of a more advanced nature. A written report will be required for which one additional credit hour will be given. For Electrical Seniors.

*Open only to students who have completed Course 15.*

*Three exercises per week. 2nd S.*

### 17. Electrical Laboratory.

This course is similar to Course 4 only a specially arranged series of experiments is provided adapted to the needs of students in the Mechanical Engineering Course. A written report will be required for which one additional credit hour will be given. For Mechanical Seniors.

*Open only to students who have completed Course 2.*

*Two exercises per week. 1st S.*

**18. Thesis.**

A deposit of fifteen dollars to cover any damage done to instruments or apparatus, etc., is required in this course. **Any unexpended balance is refunded at the close of the college year.** Where apparatus is constructed as a part of a thesis, it shall remain the property of the department. For Electrical Seniors.

*Three exercises per week. 2nd S.*

**19. Dynamo Electric Machinery.**

This course is a continuation of Course 2, but arranged to meet the requirements of students in Mechanical Engineering. This course is not as advanced as Course 11, but covers the same subjects in a more elementary manner. For Mechanical Seniors.

*Open only to students who have completed Course 2.*

*Three exercises per week. 1st S.*

**20. Dynamo Electric Machinery.**

This course is a completion of Course 19. For Mechanical Seniors.

*Open only to students who have completed Course 19.*

*Two exercises per week. 2nd S.*

**21. Industrial Electricity.**

This course consists of a careful study of the principles and methods employed in electrical measurements, such as resistance of wire and batteries, e. m. f. of cells, current measurement by ammeters and electrolysis, the use of electrical measuring instruments and a series of laboratory experiments specially arranged to meet the requirements of Chemical Engineers. A brief study will be made of the dynamo, motor, transformer, primary and secondary batteries, arc and incandescent lamps and the general principles of electrical distribution. **Experiments in electrolysis,** electrical furnaces, reduction of metals, etc. are provided. For Chemical Seniors.

*Three exercises per week. 1st S.*

**22. Industrial Electricity.**

This course is a continuation of Course 21, but more advanced in nature. For Chemical Seniors.

*Open only to students who have completed Course 21.*

*Three exercises per week. 2nd S.*



## ENGLISH.

PROF. GROVES, MR. SPENCER.

**1. English Composition and Rhetoric. Mr. Spencer.**

The theory of composition, theme writing, book reviews and an introduction to the principles of literary criticism. For all Freshmen.

*Three exercises per week. 1st S.*

**2. English Composition and Rhetoric. Mr. Spencer.**

This is a continuation of Course 1.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**3. Advanced English Composition and Criticism. Mr. Spencer.**

(a) Composition. The four forms of composition (narration, description, exposition and argumentation) will be taken up and practice given in each form. There will also be daily and weekly themes based on topics of the day, (editorials), and on required readings. (Gardner's Forms of Prose Literature.)

(b) Criticism. The history of criticism will be studied briefly, each student having one novel and one poet to criticise. (Winchester's Principles of Literary Criticism). Elective for General Course Sophomores and Juniors.

*Three exercises per week. 1st S.*

**4. The English Drama. Mr. Spencer.**

Lectures on the English drama, with required readings in Shakespeare, Sheridan and Goldsmith. There will also be recitations and discussions. Elective for General Course Juniors and Seniors.

*Three exercises per week. 2nd S.*

**5. The English Novel. Prof. Groves.**

A seminar study of the development of the English novel. Elective for General Course Juniors and Seniors after consultation with the instructor.

*Three exercises per week. 1st S.*

**6. English Literature. Prof. Groves.**

The historical development of English literature. This course is designed to set forth the philosophy of literature and the



relation of writers to their predecessors and contemporaries. Text books, lectures and readings. For Agricultural and Chemical Seniors and General Course Sophomores or Juniors.

*Three exercises per week. 2nd S.*

**7. American Literature.** Prof. Scott.

Lectures with an extensive course of reading. Elective for General Course and Agricultural Seniors.

*Four exercises per week. 2nd S.*

**FORESTRY.**

PROF. PICKETT.

**1. Principles of Forestry.**

This course is intended to give the student a knowledge of the various methods of forestry management in Europe and America. The text and lectures will cover the use of trees for shelter, shade and ornament, and their propagation; the value of trees for timber; how to improve existing woodlands; the influence of forests upon soils, crops and climate; the establishment and management of plantations and forest trees. For Agricultural Juniors.

*Three exercises per week. 1st S.*

**2. Forest Technology.**

This course aims to give the student advanced theoretical and practical work in establishing, improving and managing woodlands; in estimating and measuring standing timber and harvesting forest products; forest administration, laws and working plans. Seminary and laboratory work. Elective for Agricultural Seniors who have shown special ability in Course 1.

*Three exercises per week. 1st S.*

**3. Systematic Arboriculture.**

A study of the botanical and physical characters of forest trees and shrubs. Special stress is laid on the value of various trees for lumber, fuel, posts, etc. Rapidity of growth, denseness and strength of fiber, etc. are features given particular attention. Elective for Agricultural Juniors who wish to specialize in Forestry.

*Three exercises per week. 1st S.*

**4. Forest Nursery Management.**

A study of the methods of propagation and care of trees, shrubs, and perennial plants in the nursery. This course will be the same as Horticulture 10 except that students specializing in forestry will be given forest trees and shrubs for laboratory work instead of fruit and ornamental plants. Elective for Agricultural Juniors who wish to specialize in Forestry.

*Three exercises per week. 2nd S*

**FRENCH.**

PROF. WHORISKEY, MR. SPENCER.

**1. Elementary French. Mr. Spencer.**

Essentials of French grammar and reading, with practice in speaking and writing French. Dictation. For Freshmen offering German for admission.

*Three exercises per week. 1st S.*

**2. Elementary French. Mr. Spencer.**

Continuation of Course 1. Reading of Modern French Prose; translation from English into French of connected narrative. Dictation. For Freshmen offering German for admission.

*Three exercises per week. 2nd S.*

**3. French Prose. Prof. Whoriskey.**

Reading and translation of French Prose, Composition, Poems. Elective for General Course Juniors.

*Three exercises per week. 1st S.*

**4. French Prose, History and Travel. Prof. Whoriskey.**

Reading and Translation, Composition based on some book read in class. Elective for General Course Juniors.

*Three exercises per week. 2nd S.*

**\*5. French Prose of Nineteenth Century. Prof. Whoriskey.**

Selections from Hugo, Balzac, Sand, Dumas père, Daudet will be read. Sight reading. Elective for General Course Seniors.

*Three exercises per week. 1st S.*

**\*6. French Prose of Nineteenth Century. Prof. Whoriskey.**

Continuation of Course 5. Elective for General Course Seniors.

*Three exercises per week. 2nd S.*

- \*7. **French Literature in the Seventeenth Century.** Prof. Whoriskey.

Corneille, Racine, Molière, Bossuet, Mme. de Sévigné, La Fontaine. Elective for General Course Seniors.

*Three exercises per week. 1st S.*

- \*8. **French Literature in the Seventeenth Century.** Prof. Whoriskey.

Continuation of Course 7. Elective for General Course Seniors.

*Three exercises per week. 2nd S.*

9. **French Composition.** Prof. Whoriskey.

Elective for General Course Seniors.

*One and one-half exercises per week. 1st S.*

10. **French Composition.** Prof. Whoriskey.

Elective for General Course Seniors.

*One and one-half exercises per week. 2nd S.*

## GEOLOGY.

PROF. PARSONS, MR. BARROWS.

1. **Mineralogy.** Prof. Parsons.

A short course in blowpipe analysis, followed by laboratory practice in the determination and study of minerals, with special reference to their economic value. For Chemical Juniors, elective for Agricultural and General Course Juniors.

*Open only to students who have completed Chemistry 1 and 2.*

*Two exercises per week. 2nd S.*

2. **Elementary Geology.** Mr. Barrows.

A brief course in the elements of geology. Special attention is given to local geology and excursions are made to various points of interest in the vicinity. For Agricultural Juniors, elective for General Course Juniors and Seniors.

*Open only to students who have completed Zoology 5.*

*Three exercises per week. 2nd S.*

3. **Historical Geology.** Mr. Barrows.

The development of the continents of the earth and the evolution and distribution of the animal and plant forms from the

\*Courses 5 and 6 are to be given in 1908-1909 and then in alternate years with 7 and 8.

earliest times to the present. Recitations, lectures and laboratory work. Elective for Agricultural and General Course Seniors.

*Three exercises per week. 1st S.*

## GERMAN.

PROF. WHORISKEY, MR. SPENCER.

### 1. Elementary German. Prof. Whoriskey.

German Grammar. Declension of articles, nouns, adjectives and pronouns; verbs, weak and strong. Reading of simple stories; conversation. Dictation. For Freshmen offering French for admission.

*Three exercises per week. 1st S.*

### 2. Elementary German. Prof. Whoriskey.

Continuation of Course 1. Verbs, modal auxiliaries, essentials of syntax. Composition, Reading and Translation; Poems. Dictation. For Freshmen offering French for admission.

*Three exercises per week. 2nd S.*

### 3. German Prose of the Nineteenth Century. Prof. Whoriskey. Mr. Spencer.

Reading and Translation. Composition based on some book read in class. For all Sophomores.

*Three exercises per week. 1st S.*

### 4. Scientific German. Prof. Whoriskey, Mr. Spencer.

Reading and Translation. Composition. For all Sophomores.

*Three exercises per week. 2nd S.*

### \*5. Goethe. Prof. Whoriskey.

His Life and Works. Elective for General Course Seniors.

*Three exercises per week. 1st S.*

### \*6. Goethe. Prof. Whoriskey.

Continuation of Course 5. Elective for General Course Seniors.

*Three exercises per week. 2nd S.*

### \*7. Schiller. Prof. Whoriskey.

Life and Works. Elective for General Course Seniors.

*Three exercises per week. 1st S.*

**\*8. Schiller.**

Continuation of Course 7. Elective for General Course Seniors.

*Three exercises per week. 2nd S.*

**9. German Composition. Prof. Whoriskey.**

*One and one-half exercises per week. 1st S.*

**10. German Composition. Prof. Whoriskey.**

*One and one-half exercises per week. 2nd S.*

**HISTORY.**

PROF. SCOTT.

In the courses in History an important place is given to historical reading carried on in the reference room. In some cases a considerable part of the work is written.

*Courses 1 and 2 and Courses 3 and 4 are given in alternate years. Courses 3 and 4 are offered in 1909-'10.*

*Courses 1 to 4 are open only to students who have passed in Ancient History.*

*Courses 5 to 7 are open only to students who have passed in History and Constitution of the United States.*

**1. History of Europe from 476 to 1492.**

Recitations and collateral reading. For General Course Freshmen, elective for General Course Sophomores.

*Three exercises per week. 1st S.*

**2. History of Europe from 1492 to 1715.**

Recitations and collateral reading. For General Course Freshmen, elective for General Course Sophomores.

*Three exercises per week. 2nd S.*

**3. History of Europe from 1715 to 1815. The French Revolution.**

Recitations and collateral reading. For General Course Freshmen, elective for General Course Sophomores.

*Three exercises per week. 1st S.*

\* Courses 7 and 8 are to be given in 1908-09 and then in alternate years with 6 and 7.

**4. History of Europe since 1815.**

Recitations and collateral reading. For General Course Freshmen, elective for General Course Sophomores.

*Three exercises per week. 2nd S.*

**\*5. French Prose of Nineteenth Century. Prof. Whoriskey.**

For Agricultural Seniors, elective for General Course Juniors.

*Three exercises per week. 1st S.*

**6. Political and Constitutional History of the United States from 1783 to 1837.**

For Agricultural Seniors, elective for General Course Juniors.

*Three exercises per week. 2nd S.*

**7. Political and Constitutional History of the United States since 1837.**

Elective for General Course Seniors.

*Three exercises per week. 1st S.*

**HORTICULTURE.**

PROF. PICKETT, MR. WICKS, MR. LUMSDEN.

With the rapid development of agricultural education, the science of horticulture has become more clearly defined. Horticulture is sub-divided into five classes, viz: (1) Pomology, or fruit growing; (2) Olericulture, or Vegetable Gardening; (3) Floriculture, or Flower Growing; (4) Landscape Gardening; and (5) Nursery Practice.

**1. Principles of Horticulture. Prof. Pickett.**

This course is elementary, and comprises the fundamentals of horticulture, emphasizing the sciences upon which horticulture rests and the scope and importance of its field. For Agricultural Freshmen. First eight weeks.

*Three exercises per week. 1st S.*

**2. Olericulture.**

Lectures and recitations upon the culture, classification and identification of vegetables. The storing and marketing of vegetables are also considered. For Agricultural Freshmen.

*Open only to those who have completed Course 1.*

*Two exercises per week. 2nd S.*



**3. Practical Pomology.** Mr. Wicks.

Dealing with problems of fruit growing such as location, choice of site, kind and adaptability of soil for fruit growing, soil management, planting of orchards, pruning, sprays and spraying, thinning, harvesting and marketing. Lectures and laboratory work. For Agricultural Sophomores.

*Three exercises per week. 2nd S.*

**4. Greenhouse Construction and Management.** Mr. Lumsden.

Lectures, recitations and laboratory work. This course aims to familiarize the student with modern methods of greenhouse work and the more important plants grown under glass. Soils, varieties, culture, marketing, enemies, etc., are studied. Each student is required to do practical work in propagating, potting, watering, ventilating, etc. A study is made of the history and development of different types of greenhouses, including methods of heating and general management. For Agricultural Juniors.

*Two exercises per week. 1st S.*

**5. Landscape Gardening.** Mr. Lumsden.

An elementary course in ornamental and landscape gardening with special reference to the beautifying of home surroundings. Elective for Agricultural Juniors.

*Two exercises per week. 2nd S.*

**6. Vegetable Gardening under Glass.** Mr. Lumsden.

A study of the methods of growing market vegetables in greenhouses. Lectures and practical exercises in the greenhouse. Elective for Agricultural Seniors.

*Two exercises per week. 2nd S.*

**7. Nursery Management.** Prof. Pickett.

A study of the methods of propagation and care of trees, shrubs and perennial plants in the nursery. Lectures, reference readings and practice. Elective for Agricultural Juniors.

*Three exercises per week. 2nd S.*

**8. Small Fruit Culture.** Mr. Wicks.

A comprehensive study of the small fruits such as the strawberry, raspberry, blackberry, currant and gooseberry. Each kind of fruit is studied with reference to all the essential points such



as history, classification, propagation, planting, pruning, enemies, diseases, picking and marketing. Elective for Agricultural Juniors.

*Two exercises per week. 1st S.*

**9. Commercial Floriculture.** Mr. Lumsden.

A study of the growing of cut flowers and decorative plants. Lectures and practical exercises in the greenhouse. Elective for Agricultural Seniors.

*Three exercises per week. 1st S.*

**10. Evolution and Improvement of Plants.** Prof. Pickett.

The application of the principles of evolution to the improvement of plants. Variation, selection and heredity as applied to the problems of plant breeding in agricultural practice. Elective for Agricultural Seniors.

*Two exercises per week. 2nd S.*

**11. Commercial Orcharding and Systematic Pomology.** Mr. Wicks.

This course deals with problems of marketing fruits, packing, transportation, storage, market requirements and formation of fruitgrowers' associations and handling of by-products. Lectures and reference reading. Elective for Agricultural Seniors.

*Four exercises per week. 1st S.*

**12. Advanced Landscape Gardening.** Mr. Lumsden.

A study of the principles and composition of landscape gardening as applied to public and private grounds. Lectures, reference readings, and plans. Elective for Agricultural Seniors.

*Open only to students who have completed Course 7.*

*Two exercises per week. 2nd S.*

**13. Advanced Vegetable Gardening.**

The management of commercial vegetable gardening establishments; rotation of crops, manures, markets and special crops. Elective for Agricultural Seniors.

*Two exercises per week. 2nd S.*

## MACHINE DESIGN.

PROF. PUTNAM, MR. LATON, MR. INGHAM.

## 1. Mechanism. Prof. Putnam.

The study of machine parts with respect to their forms, motions and modes of connection; the kinematics of fluids; the theory of the slide valve. For Electrical and Mechanical Sophomores.

*Open only to students who have completed Mathematics 1—2.*

*Three exercises per week. 1st S.*

## 2. Mechanism. Prof. Putnam.

Continuation of Course 1. For Electrical and Mechanical Sophomores. First ten weeks.

*Three exercises per week. 2nd S.*

## 3. Theoretical Mechanics. Prof. Putnam, Mr. Ingham.

Composition and resolution of forces, conditions of equilibrium, center of gravity, with special attention to plane surfaces, friction, the simple machines, laws of motion, motion in a resisting medium, constrained motion, impact, work and energy, moment of inertia, particularly of plane surfaces; also strength of materials. For Engineering Juniors.

*Open only to students who have completed Mathematics 1—7 inclusive and Physics 1.*

*Four exercises per week. 1st S.*

## 4. Designing and Drawing. Prof. Putnam.

The application of Course 3 to practical problems worked out in the drafting room. For Electrical and Mechanical Juniors.

*Open only to students who have completed Mathematics 1—7 inclusive and Physics 1.*

*Four exercises per week. 1st S.*

## 5. Theoretical Mechanics. Prof. Putnam, Mr. Ingham.

Continuation of Course 3. For Engineering Juniors.

*Four exercises per week. 2nd S.*

## 6. Shop Machinery. Prof. Putnam, Mr. Laton.

The design of shop machinery of all kinds, except power plant machinery. For Mechanical Juniors.

*Three exercises per week. 2nd S.*

**MATHEMATICS.**

PROF. PETTEE, MR. LATON.

**1. Algebra Completed.** Prof. Pettee, Mr. Laton.

For all Freshmen.

*Four exercises per week. 1st S.***2. Solid Geometry, with advanced course.** Mr. Laton.

For Engineering Freshmen entering without the subject, elective for Agricultural and General Course Freshmen.

*Two exercises per week. 1st S.***3. Plane and Spherical Trigonometry.** Prof. Pettee, Mr. Laton.

For all Freshmen. First ten weeks.

*Four exercises per week. 2nd S.***4. Surveying.** Prof. Pettee.

Recitations, field-work and plotting, including compass, transit, plane-table and level work. For Engineering and Agricultural Freshmen, elective for General Course Freshmen. Last seven weeks.

*Four exercises per week. 2nd S.***5. Analytical Geometry.** Prof. Pettee.

For Engineering Sophomores, elective for General Course Sophomores.

*Five exercises per week. 1st S.***6. Differential and Integral Calculus.** Prof. Pettee.

For Engineering Sophomores, elective for General Course Sophomores.

*Five exercises per week. 2nd S.***7. Differential Equations.** Prof. Pettee.

Elective for General Course Juniors.

*Two exercises per week. 1st S.***8. Quaternions.** Prof. Pettee.

Elective for General Course Juniors.

*Two exercises per week. 2nd S.*

**9. Astronomy.** Prof. Pettee.

Elective for General Course Juniors and Seniors.

*Two exercises per week. 2nd S.*

**MECHANICAL ENGINEERING.**

PROF. CARDULLO, PROF. HEWITT, PROF. PUTNAM.

**1. Elements of Steam Engineering.** Prof. Cardullo.

Descriptive course of boilers, furnaces, steam engines and turbines, steam power appliances and gas engines. For Electrical and Mechanical Sophomores. Last seven weeks.

*Three exercises per week. 2nd S.*

**7. Thermodynamics.** Prof. Cardullo.

Study of the thermodynamic properties of gases and vapors, and of the phenomena of operation of thermodynamic engines; analysis of the causes of energy losses and methods of minimization; interpretation of indicator and temperature-entropy diagrams; study of steam engines and turbines, boilers, gas engines and producers and refrigerating machinery. For Electrical and Mechanical Juniors and Chemical Seniors.

*Open only to students who have completed Physics 1 and 2 and Mathematics 1 to 6.*

*Three exercises per week. 1st S.*

**8. Thermodynamics.** Prof. Cardullo.

Continuation of Course 7. For Electrical and Mechanical Juniors.

*Three exercises per week. 2nd S.*

**9. Mechanical Laboratory.** Prof. Cardullo.

Study of apparatus and methods of calibration used in engineering investigations; testing of iron, steel and wood; valve setting and indicator practice. A written report will be required for which one hour additional credit will be given.

*Open only to students who have completed Physics 1 and 2 and Mathematics 1 to 6.*

*Two exercises per week. 1st S.*

**10. Mechanical Laboratory.** Prof. Cardullo.

Study of miscellaneous engineering materials and apparatus, and standard methods of testing; lubricants, cement, fuels,

boilers, engines, pumps, power-plant appliances and supplies, etc. For Electrical and Mechanical Juniors.

*Open only to students who have completed Course 9.*

*Two exercises per week. 2nd S.*

**11. Hydraulics.** Prof. Cardullo.

A study of the principles and practice of hydraulic machinery and measurements. For Electrical and Mechanical Seniors.

*Open only to students who have completed Machine Design 5 and Physics 1 and 2.*

*Four exercises per week. 1st S.*

**12. Materials of Engineering.** Prof. Cardullo.

A study of the properties, commercial forms, methods of preparation and use of engineering materials. For Electrical and Mechanical Seniors.

*Three exercises per week. 1st S.*

**13. Mechanical Laboratory.** Prof. Cardullo.

A critical study and detailed analysis of the performance of engineering apparatus, particularly of steam and gas engines, hydraulic apparatus, etc. For Electrical and Mechanical Seniors.

*Open only to students who have completed Course 10.*

*Two exercises per week. 1st S.*

**14. Mechanical Laboratory.** Prof. Cardullo.

Continuation of Course 13. For Mechanical Seniors.

*Open only to students who have completed Course 13.*

*Two exercises per week. 2nd S.*

**15. Heat Engine Design.** Prof. Cardullo.

Study of the structure and proportions of heat engines; design of valves and valve gears, governors, fly wheels and principal members of steam and gas engines and steam turbines. For Mechanical Seniors.

*Five exercises per week. 1st S.*

**16. Shop Design and Equipment.** Prof. Putnam.

A study of the proper choice and arrangement of tools, machinery and equipment of all kinds for shops and factories; the design of suitable buildings for housing the same and estimates

of quantities of material and cost of construction. Particular attention will be given to textile mills and machine shops. For Mechanical Seniors.

*Four exercises per week. 2nd S.*

**17. Power Plant Design.** Prof. Hewitt, Prof. Cardullo.

A study of different types of power plants, power plant apparatus and equipment and of controlling factors in the cost of power generation and distribution; the design of a power plant to meet given conditions. For Mechanical Seniors.

*Two exercises per week. 2nd S.*

**18. Contracts and Specifications.** Prof. Hewitt.

The laws and forms of engineering contracts; standard specifications for engineering materials and apparatus. For Electrical and Mechanical Seniors.

*Two exercises per week. 2nd S.*

**19. Economics of Engineering.** Prof. Cardullo.

A discussion of the principles and practice of systems of shop organization and management, cost keeping, wage payment and methods of cost reduction; also a discussion of engineering finance, welfare work, labor conditions, factory laws, etc. For Electrical and Mechanical Seniors.

*Three exercises per week. 2nd S.*

## METEOROLOGY.

**1. Meteorology.**

Recitations and lectures on wind systems, precipitation, humidity, laws of storms and tornadoes and methods of prediction of atmospheric changes. For Agricultural Seniors, elective for General Course Seniors.

*Two exercises per week. 1st S.*

## MILITARY SCIENCE AND TACTICS.

CAPT. HUNT.

All male students, unless members of the Senior Class, or physically unfit, are required to drill and attend recitations in Military Science.

Military Science 1 to 8 inclusive consists of Military Drill and includes all the practical instruction in the following subjects:



Close and Extended Order Drills by Company and Battalion, Advance and Rear Guards, Outposts, Marches, Ceremonies, Battalion Review, Parades and Guard Mounting, Calisthenics and Gymnastics, Rifle Practice, First Aid to the Injured.

**1. Military Drill.**

For Freshmen.

*Two exercises per week. 1st S.*

**2. Military Drill.**

Continuation of Course 1. For Freshmen.

*Two exercises per week. 2nd S.*

**3. Military Drill.**

For Sophomores.

*Two exercises per week. 1st S.*

**4. Military Drill.**

Continuation of Course 3. For Sophomores.

*Two exercises per week. 2nd S.*

**5. Military Drill.**

For Juniors.

*Two exercises per week. 1st S.*

**6. Military Drill.**

Continuation of Course 5. For Juniors.

*Two exercises per week. 2nd S.*

**7. Military Drill.**

Elective for Seniors only.

*Two exercises per week. 1st S.*

**8. Military Drill.**

Continuation of Course 7. Elective for Seniors only.

*Two exercises per week. 2nd S.*

**9. Infantry Drill Regulations.**

Practical instruction and lectures. For Freshmen.

*One exercise per week. 1st S.*

**10. Manual of Guard Duty and Small Arms Firing Regulations.**

For Freshmen.

*One exercise per week. 2nd S.*



**11. Military Primer.**

Recitations and map problems covering advance and rear guards; outposts; patrols, etc.

For Sophomores.

*One exercise per week. 1st S.*

**12. Military Map Reading and Sketching.**

For Sophomores.

*One exercise per week. 2nd S.*

**13. Field Service Regulations.**

Preparation of problems requiring the issuing of field orders, knowledge of marches, transportation, subsistence, etc. For Juniors.

*One exercise per week. 1st S.*

**14. Army Regulations and Preparation of Requisitions, etc.**

For Juniors.

*One exercise per week. 2nd S.*

**15. Army Organization and Administration.**

Lectures and preparation of military papers. Elective for Seniors only.

*One exercise per week. 1st S.*

**16. Army Organization and Administration.**

Continuation of Course 15. Elective for Seniors only.

*One exercise per week. 2nd S.*

**PHILOSOPHY AND PEDAGOGY.**

PROF. GROVES.

**1. Psychology.**

An introduction to the study of mental life. The practical needs of the student are related as closely as possible to the work of the course. Elective for General Course Sophomores and Seniors.

*Three exercises per week. 1st S.*

**2. The History of Educational Theory.**

The greater part of the course is taken up with the study of the modern educational reformers, Comenius, Rousseau, Pestalozzi,

Froebel, Spencer and Herbart. Elective for General Course Freshmen and Juniors.

*Two exercises per week. 2nd S.*

### 3. Philosophy of Education.

The meaning of education is defined from the aspect of the biological, the physiological, the social, the psychological and the philosophical. Horne's *Philosophy of Education*.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

### 4. The Problems of School Education.

The method of the recitation; management and discipline of classes, observation of teaching. Elective for General Course Juniors and Seniors.

*Three exercises per week. 1st S.*

### 5. School Administration.

Courses of study; school hygiene; school law; a discussion of the essential elements of good administration. Elective for General Course Juniors and Seniors.

*Three exercises per week. 2nd S.*

### 6. Introduction to Philosophy.

A general survey of the field of philosophy with special reference to the definition of its problems, its spirit, its method and its relation to the various sciences; the theory of thought and knowledge; the doctrine of nature and of mind. This course aims to acquaint students with the ultimate problems of thought and to suggest possible solutions. Elective for General Course Juniors and Seniors.

*Three exercises per week. 1st S.*

## PHYSICS.

PROF. NESBIT.

### 1. Mechanics and Heat.

Mechanics: The principles and laws of general physics are illustrated by a number of experiments, and the student is taught to make ready application of his mathematics in the solution of problems.

It is intended to provide a foundation in the dynamics of solids, liquids and gases, and also in the subjects of statics and hydrostatics.

Instruction is given by lectures, recitations and problem work. The text used is Watson's Physics. Reference is made to Ames' Theory of Physics, Duff's Textbook of Physics, and other standard treatises.

Heat: The theories of heat are briefly discussed. The subdivisions of the subject, such as the nature of heat, its effects, thermometry, sources of heat, the transference and transformations of heat are considered in detail. Constant attention is given to the relation of these topics to the subject of thermo-dynamics. Watson's Physics is used as a text. For Agricultural and Engineering Sophomores, elective for General Course Sophomores.

*Three exercises per week. 1st S.*

## **2. Light, Sound and Electricity.**

Light: The subject is approached from the geometrical and physical standpoint. A number of experiments are performed illustrative of wave motion in general, followed by a study of that form of wave motion upon which the modern theory is based.

The subject is developed progressively and due attention is given to such subjects as reflection, refraction, color, the spectrum, and interference and polarization phenomena.

The student makes a careful study of optical instruments of all classes. Watson's Physics is used as the text.

Sound: The course consists of lectures and recitations, considerable emphasis being laid upon the relation of the subject to the transmission of speech.

The text used is Stone's Elementary Lessons in Sound.

Electricity and Magnetism: Numerous experiments are performed to illustrate the various phenomena of electrostatics, magnetism, current electricity and electric waves. As the course advances, the attention of the student is constantly called to the applications of electricity to the arts and sciences. S. P. Thompson's Elementary Lessons in Electricity and Magnetism is used as a text. For Agricultural and Engineering Sophomores, elective for General Course Sophomores.

*Three exercises per week. 2nd S.*

## **3. Elements of Least Squares and the Precision of Measurements.**

This course is intended to serve as an introduction to the work in the Physical Laboratory. It familiarizes the student with the

precautions necessary in taking experimental data and of properly using his data in order to secure the most reliable results.

A large number of problems are solved, illustrating the determination of physical constants and in deducing the constants of empirical equations. Bartlett's Least Squares is used as a text in Least Squares. The work in Precision of Measurements consists of a course of lectures and the solution of a number of problems illustrating the application of the subject. For Electrical and Mechanical Juniors, elective for General Course Juniors.

*One exercise per week. 1st S.*

#### 4. Physical Laboratory.

The apparatus employed in the experimental part of Courses 7 and 8 is adapted to no special laboratory manual, and either notes are prepared for students' use or reference is made to the works of Watson, Ames and Bliss, E. L. Nichols, H. M. Godwin and others.

The laws of general physics are investigated experimentally. The student is encouraged to acquire skill in the manipulation of apparatus, habits of clearness and neatness in keeping records, as well as enthusiasm for independent and original investigation.

A careful study is made of the Analytical Balance, time measuring devices, heat measurements, the microscope, spectroscope, lens combinations, photometry, the laws of vibrating strings and the simple electrical measurements. The student has practice in the calibration of galvanometers and ammeters, the determination of the constants of instruments, the measurement of voltages, resistances, etc.

On the completion of Courses 4 and 5, an examination is given to test the student's knowledge of physical research, both in attacking a given problem and in thinking and acting for himself. For Electrical and Mechanical Juniors, elective for General Course Juniors.

*One exercise per week. 1st S.*

#### 5. Physical Laboratory.

A continuation of Course 4. For Electrical and Mechanical Juniors, elective for General Course Juniors.

*Three exercises per week. 2nd S.*

A fee of ten dollars is required in Courses 4 and 5 to cover breakage, etc. Any unexpended balance is refunded to the student at the close of the college year.

**6. Physical Laboratory.**

Physical Laboratory work. Similar to Courses 4 and 5. For Chemical Juniors.

*Three exercises per week. 2nd S.*

**POLITICAL SCIENCE.**

PROF. SCOTT.

**1. Political Economy.**

An elementary course, with lectures upon some of the practical questions of the day. For General Course Sophomores, Agricultural Juniors and Engineering Seniors.

*Three exercises per week. 2nd S.*

**2. Laws of Business.**

Recitations supplemented by lectures and the discussion of cases. Elective for General Course Juniors and Seniors and Agricultural Seniors.

*Three exercises per week. 1st S.*

**3. American Constitutional Law.**

Use is made of Pomeroy's Constitutional Law, which is supplemented by the decisions of the United States Supreme Court. Special attention is given to the connections between American constitutions and American political history. Elective for General Course and Agricultural Seniors.

*Three exercises per week. 1st S.*

**4. Money and Banking.**

Recitations, readings and lectures. Elective for Agricultural Seniors and General Course Juniors and Seniors.

Courses 4 and 5 are given in alternate years. Course 4 will be offered in the year 1908-'09.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**5. Public Finance.**

Recitations, readings and lectures. Elective for Agricultural Seniors and General Course Juniors and Seniors.

Courses 4 and 5 are given in alternate years. Course 5 will be offered in the year 1909-'10.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**SHOP WORK.**

PROF. CARDULLO, MR. BROWN, MR. INGHAM.

Three hours' work in the shop is reckoned as one exercise.

**1. Wood Work.** Mr. Ingham.

Exercises in carpentry work, joinery and pattern making. For Engineering Freshmen, elective for General Course Freshmen. Engineering Freshmen.

*Two and one-half exercises per week. 1st S.*  
General Course Freshmen.

*Two exercises per week. 1st S.*

**2. Forging.** Mr. Brown.

This course consists of exercises in upsetting, drawing, forming and welding. For Engineering Freshmen, (Division 2). First ten weeks.

*Two exercises per week. 2nd S.*

**3. Forging.**

Same as Course 2. For Electrical and Mechanical Sophomores, (Division 1).

*Two exercises per week. 1st S.*

**4. Machine Work.** Mr. Brown.

A Course in Turning, Facing, Thread Cutting, Milling, Shaping, Scraping, Filing and Planing. For Mechanical and Electrical Sophomores.

*Two and one-half exercises per week. 2nd S.*

**9. General Machine Work.** Mr. Brown.

Continuation of Course 4. For Electrical and Mechanical Juniors.

*One exercise per week. 1st S.*

**10. Manufacturing.** Mr. Brown.

Construction and use of jigs and special fixtures; use of limit gauges, special tools, turret and screw machinery; manufacture of some simple machine, using special appliances. For Electrical and Mechanical Juniors.

*One exercise per week. 2nd S.*

**11. Special Shop Work.**

Work arranged to suit the needs of particular students.

**12. Special Shop Work.**



**13. Wood Work. Mr. Ingham.**

Same as Course 1. For Agricultural Freshmen. Last nine weeks.

*One and one-half exercises per week. 1st S.*

**14. Forging. Mr. Brown.**

For Agricultural Freshmen.

*Two exercises per week. 2nd S.*

**15. Machine Work. Mr. Brown.**

Same as Course 4. For Chemical Seniors.

*Two exercises per week. 1st S.*

**SPANISH.**

MR. SPENCER.

**1. Elementary Spanish.**

This course will consist of an elementary study of Spanish grammar, supplemented and followed by reading of easy Spanish texts.

*Three exercises per week. 1st S.*

**2. Elementary Spanish.**

This course will consist of a thorough review of Spanish grammar, based on the texts studied in Spanish 1, and reading of more advanced Spanish texts.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**ZOOLOGY.**

PROF. SANDERSON, MR. BARROWS, MR. JACKSON.

The courses in Zoology are arranged in sequence for those studying Agriculture or Economic Entomology, and for those desiring a more general course fitting them for teaching or for medical studies, though any courses offered may be taken by those who have completed previous courses necessary.

**1. Economic Entomology.**

Insects affecting crops, domestic animals, etc., their life, histories and habits and the methods of combating them; special consideration of general farm methods for control of insects affecting staple crops, and of spraying, machinery and insecticides for combating truck and fruit insects. For Agricultural Sophomores, elective for General Course Sophomores.

*Three exercises per week. 1st S.*



**2. General Entomology.**

A general survey of the structure, habits and classification of the different orders of insects. Lectures, laboratory dissections and classification. For Agricultural Sophomores, elective for General Course Sophomores.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**3. Vertebrate Anatomy and Physiology.**

The comparison of anatomy and physiology of vertebrate animals, the general physiology of higher animals, and laboratory dissections of a few typical forms. Elective for Agricultural and General Course Juniors.

*Four exercises per week. 1st S.*

**4. Advanced Economic Entomology.**

The methods of study and general principles of combating insect pests; the literature and history of economic entomology; practice in determining and rearing and combating insect pests. Elective for Agricultural Juniors or Seniors.

*Open only to students who have completed Course 2.*

*Three exercises per week. 2nd S.*

**5. Advanced Entomology.**

Advanced work in General Entomology; collecting, classification and anatomical studies. Elective for Agricultural Juniors and General Course Sophomores.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**6. Invertebrate Zoology.**

The structure and life of the invertebrate animals, except insects. Lectures and laboratory dissections of typical forms. Elective for Agricultural Seniors and General Course Sophomores, Juniors and Seniors.

*Three exercises per week. 1st S.*

**†7. General Physiology.**

The vital phenomena of animal life with special reference to the nervous, digestive, muscular, secretory and sensory processes in the higher animal forms. Elective for Agricultural and General Course Juniors or Seniors.

*Three exercises per week. 2nd S.*

**8. Evolution.**

Lectures taking up the problems of variation, heredity, breeding, and selection from an experimental standpoint, and discussions of recent theories with their bearings on the question of evolution. This course is a basis for advanced work in plant and animal breeding. For Agricultural Seniors, elective for General Course Juniors and Seniors.

*Three exercises per week. 1st S.*

**10 and 11. Advanced Zoology.**

This course is arranged to suit the individual needs of students who elect Zoology for Senior year.

*Open only to students who have completed previous courses and have shown proficiency in Zoology.*

*Three or four exercises per week throughout the year.*

**12. Biological Seminar.**

Reports and discussions upon current literature of Zoology and Botany, special topics and observations. Elective for Agricultural and General Course Juniors and Seniors.

*One exercise per week throughout the year.*

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## FOUR YEAR COURSES.

### COURSES OF STUDY AND SCHEDULE OF HOURS.

(For details see Description of Studies.)

Attendance at Chapel exercises is required of all students and attendance at Military Drill is required of all male students, unless members of the Senior Class or physically unfit.

### AGRICULTURAL COURSE.

#### Freshman Year.

#### FIRST SEMESTER.

<i>Chemistry 1</i>	Inorganic Chemistry .....	3
<i>Drawing 1</i>	Industrial Drawing .....	2

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†To be given only when elected by four or more students.

<i>English 1</i>	English Composition and Rhetoric .....	3
<i>French 1 or</i>	Elementary French .....	3
<i>German 1</i>	Elementary German .....	
<i>Horticulture 1</i>	Principles of Horticulture (first eight weeks) .....	1½
<i>Mathematics 1</i>	Algebra .....	4
* <i>Mathematics 2</i>	Solid Geometry .....	2
<i>Military Science 1</i>	Drill .....	1
<i>Military Science 3</i>	Infantry Drill Regulations.....	1
<i>Shop Work 13</i>	Wood Shop (last nine weeks)...	1½

## SECOND SEMESTER.

<i>Chemistry 2</i>	Inorganic Chemistry .....	2
<i>Drawing 4</i>	Design of Farm Buildings.....	2
<i>English 2</i>	English Composition and Rhetoric .....	3
<i>French 2 or</i>	Elementary French .....	3
<i>German 2</i>	Elementary German .....	
<i>Horticulture 2</i>	Olericulture .....	2
<i>Mathematics 3</i>	Trigonometry (first ten weeks)..	2½
<i>Mathematics 4</i>	Surveying (last seven weeks)...	1½
<i>Military Science 2</i>	Drill .....	1
<i>Military Science 30</i>	Manual of Guard Duty, etc.....	1
<i>Shop Work 14</i>	Forge Shop .....	2

## Sophomore Year.

## FIRST SEMESTER.

<i>An. Husb. 1</i>	Breeds of Livestock .....	3
<i>Botany 1</i>	General Botany .....	3
<i>Chemistry 4</i>	Qualitative Analysis .....	3
<i>German 3</i>	German Prose of the Nineteenth Century .....	3
<i>Military Science 3</i>	Drill .....	1
<i>Military Science 11</i>	Military Primer .....	1
<i>Physics 1</i>	Mechanics and Heat .....	3
<i>Zoology 1</i>	Economic Entomology .....	3

## SECOND SEMESTER.

<i>Botany 2</i>	General Botany .....	3
<i>Chemistry 6</i>	Organic Chemistry .....	3
<i>German 4</i>	Scientific German .....	3
<i>Horticulture 3</i>	Practical Pomology .....	3
<i>Military Science 4</i>	Drill .....	1
<i>Military Science 12</i>	Military Map Reading and Sketching .....	1
<i>Physics 2</i>	Light, Sound and Electricity.....	3
<i>Zoology 2</i>	General Entomology .....	3

\* Elective.

## Junior Year.

## FIRST SEMESTER.

<i>Agronomy</i> 1	Farm Equipment and Farm Crops	3
‡ <i>Botany</i> 3 or	Plant Pathology .....	4
‡ <i>Zoology</i> 3	Vertebrate Anatomy and Physi-	
	ology .....	4
<i>Dairying</i> 1	Farm Dairying .....	4
<i>Forestry</i> 1	Principles of Forestry .....	3
<i>Horticulture</i> 4	Greenhouse Construction and	
	Management .....	2
* <i>Horticulture</i> 8	Small Fruit Culture.....	2
<i>Military Science</i> 5	Drill .....	1
<i>Military Science</i> 13	Field Service Regulations.....	1

## SECOND SEMESTER.

<i>Agronomy</i> 2	Soils and Soil Physics .....	3
<i>An. Husb.</i> 3	Stock Feeding .....	3
* <i>An. Husb.</i> 4	Veterinary Science .....	3
* <i>An. Husb.</i> 6	Advanced Livestock .....	3
* <i>Botany</i> 4 or	Mycology .....	3
* <i>Botany</i> 5	Plant Physiology .....	3
* <i>Dairying</i> 3	Technology of Milk.....	2
<i>Geology</i> 2	Elementary Geology .....	3
* <i>Horticulture</i> 5	Landscape Gardening .....	3
* <i>Horticulture</i> 7	Nursery Management .....	3
<i>Military Science</i> 6	Drill .....	1
<i>Military Science</i> 14	Army Regulations .....	1
<i>Political Science</i> 1	Political Economy .....	3
* <i>Zoology</i> 4 or	Advanced Economic Entomology )	
* <i>Zoology</i> 5 or	Advanced Entomology .....	3
* <i>Zoology</i> 7	General Physiology .....	

During the Junior Year students who desire and are qualified to take up work in the Biological or Chemical Divisions of the Agricultural Course may substitute work in these divisions for Dairying 1 and Animal Husbandry 3.

## Senior Year.

## FIRST SEMESTER.

<i>Agronomy</i> 5	Agricultural Seminar .....	2
<i>History</i> 5	American History to 1783.....	3
<i>Meteorology</i> 1	Meteorology .....	2
<i>Thesis</i>	.....	2
<i>Zoology</i> 8	Evolution .....	3
<i>Elective Courses</i>	.....	6

\*Elective.

‡Botany 3 should be elected by students intending to specialize in Horticulture. Zoology 3, by those intending to specialize in Animal Husbandry or Zoology.

## SECOND SEMESTER.

<i>Agronomy</i> 6	Agr. History and Economics (first nine weeks) .....	2
<i>Agronomy</i> 7	Farm Mechanics (last eight weeks) .....	2
<i>English</i> 6	English Literature .....	3
<i>History</i> 6	Const. and Political History of U. S. (1783-1837) .....	3
<i>Thesis</i>	.....	2
<i>Elective Courses</i>	.....	6

## ENGINEERING COURSES.

## Freshman Year.

## FIRST SEMESTER.

<i>Chemistry</i> 1	Inorganic Chemistry .....	3
<i>Drawing</i> 1	Industrial Drawing .....	2½
<i>English</i> 1	English Composition and Rhetoric .....	3
<i>French</i> 1 or	Elementary French .....	3
<i>German</i> 1	Elementary German .....	3
<i>Mathematics</i> 1	Algebra .....	4
‡ <i>Mathematics</i> 2	Solid Geometry .....	2
<i>Military Science</i> 1	Drill .....	1
<i>Military Science</i> 9.	Infantry Drill Regulations.....	1
<i>Shop Work</i> 1	Wood Work .....	2½

## SECOND SEMESTER.

<i>Chemistry</i> 2	Inorganic Chemistry .....	2
‡ <i>Chemistry</i> 4	Qualitative Analysis (first division) .....	3
<i>Drawing</i> 2	Descriptive Geometry (first division) .....	3
<i>Drawing</i> 2	Descriptive Geometry (second division), (first ten weeks)...	2
<i>Drawing</i> 3	Continuation of Drawing 2 (second division), (last seven weeks) .....	2
<i>English</i> 2	English Composition and Rhetoric .....	3
<i>French</i> 2 or	Elementary French .....	3
<i>German</i> 2	Elementary German .....	
<i>Mathematics</i> 3	Trigonometry (first ten weeks) ..	2½
<i>Mathematics</i> 4	Surveying (last seven weeks)...	1½
<i>Military Science</i> 2	Drill .....	1
<i>Military Science</i> 10	Manual of Guard Duty, etc.....	1
‡ <i>Shop Work</i> 2	Forging (second division) (first ten weeks) .....	2

\*Elective.

‡For Freshmen entering without the subject.

†Division 1 elects Chemistry 4 instead of Shop Work 2 and Division 2 elects Shop Work 2 instead of Chemistry 4.

## CHEMICAL ENGINEERING COURSE.

## Sophomore Year.

## FIRST SEMESTER.

<i>Chemistry 5</i>	Qualitative Analysis (first five weeks) .....	1½
<i>Chemistry 10</i>	Quantitative Analysis (last twelve weeks) .....	3½
<i>Drawing 7</i>	Elementary Machine Drawing and Free Hand Drawing of Chem. Apparatus .....	2
<i>German 3</i>	German Prose of the Nineteenth Century .....	3
<i>Mathematics 5</i>	Analytical Geometry .....	5
<i>Military Science 3</i>	Drill .....	1
<i>Military Science 11</i>	Military Primer .....	1
<i>Physics 1</i>	Mechanics and Heat .....	3

## SECOND SEMESTER.

<i>Chemistry 6</i>	Organic Chemistry .....	3
<i>Chemistry 11</i>	Quantitative Analysis .....	6
<i>German 4</i>	Scientific German .....	3
<i>Mathematics 6</i>	Calculus .....	5
<i>Military Science 4</i>	Drill .....	1
<i>Military Science 12</i>	Military Map Reading and Sketching .....	1
<i>Physics 2</i>	Light, Sound and Electricity....	3

## Junior Year.

## FIRST SEMESTER.

<i>Chemistry 7</i>	Chemistry of Plant and Animal Nutrition .....	2
<i>Chemistry 8</i>	Organic Chemical Laboratory....	3
<i>Chemistry 12</i>	Advanced Quantitative Analysis..	5
<i>Chemistry 19</i>	Chemical Journals .....	2
† <i>Chemistry 21</i>	Physical Chemistry .....	2
<i>Machine Design 3</i>	Theoretical Mechanics .....	4
<i>Military Science 5</i>	Drill .....	1
<i>Military Science 13</i>	Field Service Regulations .....	1

## SECOND SEMESTER.

<i>Chemistry 13</i>	Advanced Quantitative Analysis	4
† <i>Chemistry 14</i> and	Industrial Chemistry .....	2
† <i>Chemistry 15</i> or	Metallurgy .....	1
† <i>Chemistry 22</i>	Physical and Electro-chemistry	3
<i>Chemistry 20</i>	Chemical Journals .....	2
<i>Geology 1</i>	Mineralogy .....	2
<i>Machine Design 5</i>	Theoretical Mechanics .....	4
<i>Military Science 6</i>	Drill .....	1
<i>Military Science 14</i>	Army Regulations .....	1
<i>Physics 6</i>	Physical Laboratory .....	3

†Given in alternate years.



## Senior Year.

## FIRST SEMESTER.

<i>Chemistry 16</i>	Assaying .....	1
<i>Chemistry 21</i>	Physical Chemistry .....	2
<i>Chemistry 23</i>	Chemical Research and Thesis..	8
<i>Elect. Engineering 21</i>	Industrial Electricity .....	3
<i>Mech. Engineering 7</i>	Thermodynamics .....	3
* <i>Military Science 7</i>	Drill .....	1
* <i>Military Science 15</i>	Army Organization and Adminis- tration .....	1
<i>Shop Work 15</i>	Machine Shop .....	2

## SECOND SEMESTER.

† <i>Chemistry 14</i> and	Industrial Chemistry .....	2
† <i>Chemistry 15</i> or	Metallurgy .....	1
† <i>Chemistry 22</i>	Physical and Electro-chemistry )	3
<i>Chemistry 24</i>	Thesis .....	8
<i>Elect. Engineering 22</i>	Industrial Electricity .....	3
<i>English 6</i>	English Literature .....	3
* <i>Military Science 8</i>	Drill .....	1
* <i>Military Science 16</i>	Army Organization and Admin- istration .....	1
<i>Political Science 1</i>	Political Economy .....	3

## ELECTRICAL AND MECHANICAL ENGINEERING COURSES.

## Sophomore Year.

## FIRST SEMESTER.

‡ <i>Chemistry 4</i>	Qualitative Chemical Analysis..	3
<i>Drawing 5</i>	Descriptive Geometry (first di- vision) (first seven weeks)..	1
<i>Drawing 6</i>	Elementary Machine Drawing (first division), (last ten weeks) .....	1½
<i>Drawing 6</i>	Elementary Machine Drawing (second division) .....	2
<i>German 3</i>	German Prose of the Nineteenth Century .....	3
<i>Mathematics 5</i>	Analytical Geometry .....	5
<i>Machine Design 1</i>	Mechanism .....	3
<i>Military Science 3</i>	Drill .....	1
<i>Military Science 11</i>	Military Primer .....	1
<i>Physics 1</i>	Mechanics and Heat .....	3
‡ <i>Shop Work 3</i>	Forging (first division) .....	2

\*Elective.

† Given in alternate years.

‡ Division 1 elects Shop Work 3 instead of Chemistry 4, and Division 2 elects Chemistry 4 instead of Shop Work 3.



## SECOND SEMESTER.

<i>Drawing</i> 8	Machine Drawing .....	2½
<i>German</i> 4	Scientific German .....	3
<i>Mathematics</i> 6	Calculus .....	5
<i>Machine Design</i> 2	Mechanism (first ten weeks) ..	3
<i>Mech. Engineering</i> 1	Elements of Steam Engineering (last seven weeks) .....	
<i>Military Science</i> 4	Drill .....	1
<i>Military Science</i> 12	Military Map Reading and Sketching .....	1
<i>Physics</i> 2	Light, Sound and Electricity ...	3
<i>Shop Work</i> 4	Machine Work .....	2½

## ELECTRICAL ENGINEERING COURSE.

## Junior Year.

## FIRST SEMESTER.

<i>Elec. Engineering</i> 1	Dynamo Electric Machinery ....	3
<i>Machine Design</i> 3	Theoretical Mechanics .....	4
<i>Machine Design</i> 4	Designing and Drawing .....	4
<i>Mech. Engineering</i> 7	Thermodynamics .....	3
<i>Mech. Engineering</i> 9	Mechanical Laboratory .....	2
<i>Military Science</i> 5	Drill .....	1
<i>Military Science</i> 13	Field Service Regulations .....	1
<i>Physics</i> 3	Least Squares .....	1
<i>Physics</i> 4	Physical Laboratory .....	1
<i>Shop Work</i> 9	Machine Work .....	1

## SECOND SEMESTER.

<i>Elect. Engineering</i> 2	Dynamo Electric Machinery ....	3
<i>Machine Design</i> 5	Theoretical Mechanics .....	4
<i>Machine Design</i> 6	Shop Machinery .....	3
<i>Mech. Engineering</i> 8	Thermodynamics .....	3
<i>Mech. Engineering</i> 10	Mechanical Laboratory .....	2
<i>Military Science</i> 6	Drill .....	1
<i>Military Science</i> 14	Army Regulations .....	1
<i>Physics</i> 5	Physical Laboratory .....	3

## Senior Year.

## FIRST SEMESTER.

<i>Elect. Engineering</i> 17	Electrical Laboratory .....	2
<i>Elect. Engineering</i> 19	Dynamo Electric Machinery ....	3
<i>Mech. Engineering</i> 11	Hydraulics .....	4
<i>Mech. Engineering</i> 12	Materials of Engineering .....	3
<i>Mech. Engineering</i> 13	Mechanical Laboratory .....	3
<i>Mech. Engineering</i> 15	Heat Engine Design .....	5
* <i>Military Science</i> 7	Drill .....	1
* <i>Military Science</i> 15	Army Organization and Adminis- tration .....	1

\*Elective.

## SECOND SEMESTER.

<i>Elect. Engineering</i> 20	Dynamo Electric Machinery....	2
<i>Mech. Engineering</i> 14	Mechanical Laboratory .....	3
<i>Mech. Engineering</i> 16	Shop Design and Equipment....	4
<i>Mech. Engineering</i> 17	Power Plant Design .....	2
<i>Mech. Engineering</i> 19	Economics of Engineering.....	3
* <i>Military Science</i> 8	Drill .....	1
* <i>Military Science</i> 16	Army Organization and Adminis- tration .....	1
<i>Political Science</i> 1	Political Economy .....	3
<i>Thesis</i>	.....	3

## GENERAL COURSE.

The requirements for graduation from the General Course include (1) the completion of all required studies, (2) the completion of one hundred and forty-four semester hours and (3) the election of studies during the Sophomore, Junior and Senior Years according to the group system.

The group system requires that all General Course students shall elect one *major* and two *minor* courses; the *major* to consist of twenty-one credit hours including thesis, in one of the three groups, in addition to the required work of the Freshman Year; and the *minor* to consist of fifteen credit hours in each of the other two groups, in addition to the required work of the Freshman Year.

## GROUP I.

Languages and Literature:—English; French; German; Spanish.

## GROUP II.

Mathematics and Sciences:—Mathematics; Zoology; Drawing; Agriculture; Mechanical Engineering; Electrical Engineering; Chemistry; Botany; Physics; Geology; Meteorology.

## GROUP III.

History; Social Science and Philosophy:—History; Political Science; Philosophy and Pedagogy.

## Freshman Year.

## FIRST SEMESTER.

<i>Chemistry</i> 1	Inorganic Chemistry .....	3
* <i>Drawing</i> 1	Industrial Drawing .....	2

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\*Elective

<i>English 1</i>	English Composition and Rhetoric .....	3
<i>French 1</i> or	Elementary French .....	3
<i>German 1</i>	Elementary German .....	
<i>History 1</i>	History of Europe from 476 to 1492 .....	3
<i>Mathematics 1</i>	Algebra .....	4
* <i>Mathematics 2</i>	Solid Geometry .....	2
<i>Military Science 1</i>	Drill .....	1
<i>Military Science 9</i>	Infantry Drill Regulations.....	1
* <i>Shop Work 1</i>	Wood Work .....	2

## SECOND SEMESTER.

<i>Chemistry 2</i>	Inorganic Chemistry .....	2
† <i>Drawing 16</i>	Free Hand or Charcoal Drawing (Last seven weeks) .....	1½
<i>English 2</i>	English Composition and Rhetoric .....	3
<i>French 2</i> or	Elementary French .....	3
<i>German 2</i>	Elementary German .....	
<i>History 2</i>	History of Europe from 1492 to 1715 .....	3
<i>Mathematics 3</i>	Trigonometry (first ten weeks)..	2½
† <i>Mathematics 4</i>	Surveying (Last seven weeks)..	1½
<i>Military Science 2</i>	Drill .....	1
<i>Military Science 10</i>	Manual of Guard Duty.....	1
* <i>Philosophy 2</i>	History of Educational Theory..	2

## Sophomore Year.

## FIRST SEMESTER.

† <i>Botany 1</i> or	General Botany .....	3
† <i>Zoology 1</i> or	Economic Entomology .....	
† <i>Zoology 6</i>	Invertebrate Zoology.....	
* <i>Chemistry 4</i>	Qualitative Analysis .....	3
* <i>Drawing 9</i>	Free Hand Drawing .....	2
* <i>English 3</i>	Advanced English Composition and Criticism .....	3
<i>German 3</i>	German Prose of the Nineteenth Century .....	3
* <i>History 1</i> or	History of Europe from 476 to 1492 .....	3
* <i>History 3</i>	History of Europe from 1715 to 1815 .....	
* <i>Mathematics 5</i>	Analytical Geometry .....	5
<i>Military Science 3</i>	Drill .....	1
<i>Military Science 11</i>	Military Primer .....	1
* <i>Philosophy 1</i>	Psychology .....	3
* <i>Physics 1</i>	Mechanics and Heat .....	3

\*Elective.

† Freshmen are required to elect either Drawing 16 or Mathematics 4. Sophomores are required to elect one out of each group.

## SECOND SEMESTER.

†Botany 2 or	General Botany .....	} 3
†Zoology 2 or	General Entomology .....	
†Zoology 5	Advanced Entomology .....	} 2
*Drawing 10	Free Hand Drawing .....	
‡English 6	English Literature .....	3
German 4	Scientific German .....	3
*History 2 or	History of Europe from 1492 to	} 3
	1715 .....	
*History 4	History of Europe since 1815 .....	5
*Mathematics 6	Calculus .....	1
Military Science 4	Drill .....	1
Military Science 12	Military Map Reading and	} 1
	Sketching .....	
*Physics 2	Light, Sound and Electricity....	3
*Philosophy 2	History of Educational Theory..	2
Political Science 1	Political Economy .....	3

## Junior Year.

## FIRST SEMESTER.

All elective except Military Science and Drill and English 6.

Botany 3	Plant Pathology .....	4
Botany 6.....	Plant Histology .....	3
Chemistry 4	Qualitative Analysis .....	3
Drawing 11	Architectural Drawing .....	3
English 3	Advanced English Composition..	3
English 5	English Novel .....	3
French 3	Scientific French .....	3
History 5	American History to 1783.....	3
Mathematics 7	Differential Equations .....	2
Military Science 5	Drill .....	1
Military Science 13	Field Service Regulations .....	1
Philosophy 4	Problems of School Education..	3
Philosophy 6	Introduction to Philosophy.....	3
Physics 3	Least Squares and Precision of	} 1
	Measurements .....	
Physics 4	Physical Laboratory .....	1
Political Science 2	Laws of Business .....	3
Spanish 1	Elementary Spanish .....	3
Zoology 3	Vertebrate Anatomy and Physi-	} 4
	ology .....	
Zoology 6	Invertebrate Zoology .....	3
Zoology 8	Evolution .....	3

## SECOND SEMESTER.

Botany 4	Mycology .....	3
Botany 5	Plant Physiology .....	3

\*Elective.

†Students are required to elect one of the group.

‡Required in Sophomore or Junior year.

<i>Chemistry</i> 6	Organic Chemistry .....	3
<i>Chemistry</i> 8	Organic Chemical Laboratory...	3
<i>Drawing</i> 12	Architectural Drawing .....	3
<i>English</i> 4	English Drama .....	3
‡ <i>English</i> 6	English Literature .....	3
<i>French</i> 4	French Prose, History and Travel	3
<i>Geology</i> 1	Mineralogy .....	2
<i>Geology</i> 2	Elementary Geology .....	3
<i>History</i> 6	Const. and Political History of	
	U. S., 1783-1837.....	3
<i>Mathematics</i> 8	Quaternions .....	2
<i>Military Science</i> 6	Drill .....	1
<i>Military Science</i> 14	Army Regulations .....	1
<i>Philosophy</i> 3	Philosophy of Education .....	3
<i>Philosophy</i> 5	School Administration .....	3
<i>Physics</i> 5	Physical Laboratory.....	3
<i>Political Science</i> 4 or	Money and Banking .....	3
<i>Political Science</i> 5	Public Finance .....	3
<i>Spanish</i> 2	Elementary Spanish .....	3
<i>Zoology</i> 7	General Physiology .....	3

## Senior Year.

## FIRST SEMESTER.

All elective.		
<i>Botany</i> 3 or	Plant Pathology .....	3
<i>Botany</i> 6 or	Plant Histology .....	
<i>Botany</i> 7	Advanced Botany .....	
<i>Chemistry</i> 7	Chemistry of Plant and Animal	
	Nutrition .....	2
<i>Drawing</i> 13	Advanced Architectural Drawing	3
<i>English</i> 5	English Novel .....	3
<i>French</i> 5	French Prose of 19th Century....	3
<i>Geology</i> 3	Historical Geology .....	3
<i>German</i> 5	Goethe, His Life and Works....	3
<i>History</i> 7	Const. and Political History of	
	U. S. since 1837 .....	3
<i>Meteorology</i> 1	Meteorology .....	2
<i>Military Science</i> 7	Drill .....	1
<i>Military Science</i> 15	Army Organization and Adminis-	
	tration .....	1
<i>Philosophy</i> 1	Psychology .....	3
<i>Philosophy</i> 4	Problems of School Education...	3
<i>Philosophy</i> 6	Introduction to Philosophy ....	3
<i>Political Science</i> 2	Laws of Business .....	3
<i>Political Science</i> 3	American Constitutional Law...	3
<i>Spanish</i> 1	Elementary Spanish .....	3
<i>Thesis</i>	.....	2
<i>Zoology</i> 6	Invertebrate Zoology.....	3
<i>Zoology</i> 8	Evolution .....	3
<i>Zoology</i> 10	Advanced Zoology.....	3 or 4

‡Required in either the Sophomore or Junior year.

## SECOND SEMESTER.

<i>Botany</i> 4 or	Mycology .....	}	3
<i>Botany</i> 5 or	Plant Physiology .....		
<i>Botany</i> 8	Advanced Botany .....		
<i>Drawing</i> 14	Advanced Architectural Drawing		2
<i>English</i> 4	English Drama .....		3
<i>English</i> 7	American Literature .....		4
<i>French</i> 6	French Prose of 19th Century...		3
<i>Geology</i> 2	Elementary Geology .....		3
<i>German</i> 6	Goethe (continued) .....		3
<i>Mathematics</i> 9	Astronomy .....		2
<i>Military Science</i> 8	Drill .....		1
<i>Military Science</i> 16	Army Organization and Adminis- tration .....		1
<i>Philosophy</i> 5	School Administration .....		3
<i>Political Science</i> 4 or	Money and Banking .....	}	3
<i>Political Science</i> 5	Public Finance .....		
<i>Spanish</i> 2	Elementary Spanish .....		3
<i>Thesis</i>	.....		1 or 2
<i>Zoology</i> 7	General Physiology.....		3
<i>Zoology</i> 11	Advanced Zoology.....		3 or 4



# AGRICULTURAL COURSE—FRESHMAN YEAR.

AND THE MECHANIC ARTS.

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## FIRST SEMESTER

Day	8-9	9-10	10-11	11-12	P. M.
Monday		Mathematics 1 French 1 German 1	Chemistry 1	Military Sci. 1	Drawing 1
Tuesday	English 1		Mathematics 1	Military Sci. 9	Drawing 1
Wednesday		Chemistry 1 1st Div.	Chemistry 1 2nd Div.	Horticulture 1 (First eight weeks)	Shop Work 13 (Last nine weeks)
Thursday	English 1	French 1 German 1	Mathematics 1	Mathematics 1	Horticulture 1 (First eight weeks)
Friday		Chemistry 1 1st Div.	Chemistry 1 2nd Div.	Military Sci. 1	Shop Work 13 (Last nine weeks)
Saturday	English 1	French 1 German 1	Mathematics 1	Mathematics 1	Horticulture 1 (First eight weeks)

## SECOND SEMESTER

Monday	Military Sci. 10		Chemistry 2	Military Sci. 2	Shop Work 14 (First ten weeks)
Tuesday	English 2	French 2 German 2		Mathematics 3 (First ten weeks)	Mathematics 4 (Last seven weeks)
Wednesday	Drawing 4	Drawing 4 French 2 German 2	Horticulture 2 Mathematics 3 (First ten weeks)	Mathematics 3 (First ten weeks)	Shop Work 14 (First ten weeks)
Thursday	English 2			Mathematics 3 (First ten weeks)	Mathematics 4 (Last seven weeks)
Friday	Drawing 4	Drawing 4 French 2 German 2	Chemistry 2 Mathematics 3 (First ten weeks)	Military Sci. 2	Drawing 4 (First ten weeks)
Saturday	English 2			Mathematics 3 (First ten weeks)	Mathematics 4 (Last seven weeks)

Mathematics 2, First Semester, hours to be arranged.



## AGRICULTURAL COURSE—SOPHOMORE YEAR.

FIRST SEMESTER					
Day	8-9	9-10	10-11	11-12	P. M.
Monday .....		Military Sci. 11	†Botany 1	†Military Sci. 3	Chemistry 4
Tuesday .....		Zoology 1	Physics 1	German 3	Chemistry 4
Wednesday .....	Animal Husb. 1		Botany 1	Botany 1	Chemistry 4
Thursday .....	Zoology 1	Zoology 1	Physics 1	German 3	Animal Husb. 1
Friday .....	Animal Husb. 1		†	†Military Sci. 3	Zoology 1
Saturday .....	Botany 1	Botany 1	Physics 1	German 3	
SECOND SEMESTER					
Monday .....	Chemistry 6	Zoology 2	†Botany 2	†Military Sci. 4	Horticulture 3
Tuesday .....		Chemistry 6	Physics 2	German 4	Botany 2
Wednesday .....	Horticulture 3		Military Sci. 12		Botany 2
Thursday .....		Chemistry 6	Physics 2	German 4	
Friday .....	Horticulture 3		†Zoology 2	†Military Sci. 4	Zoology 2
Saturday .....			Physics 2	German 4	

†These periods are transposed from December 1 to March 31.

# AGRICULTURAL COURSE—JUNIOR YEAR.

AND THE MECHANIC ARTS.

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Day	8-9	9-10	10-11	11-12	P. M.
Monday .....	*Horticulture 8	Forestry 1		Military Sci. 5	Zoology 3 Botany 3
Tuesday .....	Chemistry 7	Forestry 1		Agronomy 1	Horticulture 4
Wednesday .....	Chemistry 7	Dairying 1	Zoology 3 Botany 3	Horticulture 4	Forestry 1
Thursday .....	Dairying 1	Dairying 1	Dairying 1	Agronomy 1	Zoology 3 Botany 3
Friday .....	*Horticulture 8	Dairying 1	Zoology 3 Botany 3	Military Sci. 5	Agronomy 1
Saturday .....	Dairying 1	Dairying 1	Dairying 1	Military Sci. 13	

FIRST SEMESTER

Day	8-9	9-10	10-11	11-12	P. M.
Monday .....	*Horticulture 5	*Horticulture 5	Geology 2	Military Sci. 6	Agronomy 2
Tuesday .....	*Horticulture 7 *Animal Husb. 6	Political Sci. 1	*Animal Husb. 4	Agronomy 2	*Botany 4 or 5 *Dairying 3 *Zoology 4 or 5
Wednesday .....	*Botany 4 or 5	*Botany 4 or 5	Animal Husb. 3	Agronomy 2	*Animal Husb. 6 *Horticulture 7 *Zoology 4 or 5
Thursday .....	*Horticulture 7 *Animal Husb. 6	Political Sci. 1	Animal Husb. 3	Geology 2	Geology 2
Friday .....	*Horticulture 5	*Horticulture 5 *Dairying 3	*Animal Husb. 4 *Botany 4 or 5 *Animal Husb. 4	Military Sci. 6	Animal Husb. 3
Saturday .....		Political Sci. 1	*Zoology 4 or 5	Military Sci. 14	

SECOND SEMESTER

For hours of courses not scheduled, see instructor.  
\*Elective.

## AGRICULTURAL COURSE—SENIOR YEAR.

FIRST SEMESTER					
Day	8-9	9-10	10-11	11-12	P. M.
Monday	*Zoology 6	*Animal Husb. 7 *Animal Husb. 7 Zoology 6	*Dairying 6 *Horticulture 9	*Horticulture 11	*Agronomy 3
Tuesday	Zoology 8		History 5 *Dairying 6 *Horticulture 9	*Horticulture 11	Agronomy 5 *Botany 5
Wednesday		Meteorology 1		*Agronomy 3	*Animal Husb. 7
Thursday	Zoology 8	*Botany 5	History 5	*Animal Husb. 7	*Agronomy 3 *Horticulture 11
Friday		Meteorology 1	*Botany 5	*Horticulture 11	*Horticulture 9 *Zoology 6
Saturday	Zoology 8		History 5		
SECOND SEMESTER					
Monday	*Horticulture 10	Agronomy 6 (First nine weeks) Agronomy 7 (Last eight weeks)	History 6	*Agronomy 4	*Botany 5
Tuesday	*Horticulture 6	(First nine weeks) Agronomy 7 (Last eight weeks) Agronomy 6 (First nine weeks) Agronomy 7 (Last eight weeks)	English 6	*Animal Husb. 2	*Animal Husb. 5
Wednesday	*Horticulture 10	Agronomy 6 (First nine weeks) Agronomy 7 (Last eight weeks)	History 6	*Animal Husb. 2	*Botany 5
Thursday	*Horticulture 12 or *Horticulture 13	*Animal Husb. 5	English 6	*Agronomy 4	*Horticulture 6
Friday		*Horticulture 12 or *Horticulture 13	History 6		
Saturday			English 6		

\*Elective.

For hours of courses not scheduled see instructor.

## ENGINEERING COURSES—FRESHMAN YEAR.

## FIRST DIVISION.

Day	8-9	9-10	10-11	11-12	P. M.
Monday		English 1	Chemistry 1	Military Sci. 1	Shop Work 1
Tuesday	German 1	French 1	Military Sci. 9 (Sec. 1)	Mathematics 1	Shop Work 1
Wednesday		English 1	Chemistry 1	Mathematics 1	Drawing 1 Shop Work 1
Thursday	German 1	French 1	Mathematics 1	Mathematics 1	Drawing 1
Friday		English 1	Chemistry 1	Military Sci. 1	Drawing 1
Saturday	German 1	French 1	Mathematics 1	Mathematics 1	

FIRST SEMESTER

Monday	German 2	English 2	Chemistry 2	Military Sci. 2	Chemistry 4 (First ten weeks) Mathematics 4 (Last seven weeks) Chemistry 4
Tuesday	Drawing 2	French 2 Drawing 2	Mathematics 3 (First ten weeks)	Military Sci. 10 (1st sec.)	(First ten weeks) Mathematics 4 (Last seven weeks) Chemistry 4
Wednesday	German 2	English 2	Mathematics 3 (First ten weeks) Mathematics 3 (First ten weeks) Drawing 2 (Last seven weeks)	Military Sci. 10 (2d sec.) Mathematics 3 (First ten weeks) Drawing 2 (Last seven weeks)	(First ten weeks) Mathematics 4 (Last seven weeks) Chemistry 4 (First ten weeks) Mathematics 4 (Last seven weeks) Chemistry 4
Thursday	Drawing 2	French 2 Drawing 2			
Friday	German 2	English 2	Chemistry 2	Military Sci. 2	(First ten weeks) Mathematics 4 (Last seven weeks)
Saturday	Drawing 2	French 2 Drawing 2	Mathematics 3 (First ten weeks) Drawing 2 (Last seven weeks)	Mathematics 3 (First ten weeks) Drawing 2 (Last seven weeks)	

SECOND SEMESTER

Mathematics 2, First Semester, hours to be arranged.

## ENGINEERING COURSES—FRESHMAN YEAR.

## SECOND DIVISION.

Day	8-9	9-10	10-11	11-12	P. M.
Monday		Mathematics 1 French 1 German 1	Chemistry 1	Military Sci. 1	Drawing 1
Tuesday	English 1		Mathematics 1	Military Sci. 9 (Sec. 1)	Drawing 1
Wednesday		French 1 German 1	Chemistry 1	Military Sci. 9 (Sec. 2)	Drawing 1 Shop Work 1
Thursday	English 1		Mathematics 1	Mathematics 1	Shop Work 1
Friday		French 1 German 1	Chemistry 1	Military Sci. 1	Shop Work 1
Saturday	English 1		Mathematics 1	Mathematics 1	

FIRST SEMESTER

Monday		Military Sci. 10 (Sec. 1)	Chemistry 2	Military Sci. 2 Mathematics 3 Drawing 3 (Last seven weeks)	Drawing 2 (First ten weeks) Mathematics 4 (Last seven weeks)
Tuesday	English 2	French 2 German 2	Drawing 3 (Last seven weeks)	Mathematics 3 Drawing 3 (Last seven weeks)	Drawing 2 (First ten weeks) Mathematics 4 (Last seven weeks)
Wednesday	Drawing 2 (First ten weeks)	Drawing 2 (First ten weeks)	Drawing 2 (First ten weeks) Mathematics 3 (First ten weeks)	Mathematics 3 (First ten weeks) Mathematics 3 (First ten weeks) Drawing 3 (Last seven weeks)	Shop Work 2 (First ten weeks) Mathematics 4 (Last seven weeks) Shop Work 2 (First ten weeks) Mathematics 4 (Last seven weeks)
Thursday	English 2	French 2 German 2	Drawing 3 (Last seven weeks)		Shop Work 2 (First ten weeks) Mathematics 4 (Last seven weeks)
Friday	Drawing 2 (First ten weeks)	Drawing 2 (First ten weeks)	Chemistry 2 Mathematics 3 (First ten weeks) Drawing 3 (Last seven weeks)	Military Sci. 2 Mathematics 3 (First ten weeks) Drawing 3 (Last seven weeks)	Shop Work 2 (First ten weeks) Mathematics 4 (Last seven weeks)
Saturday	English 2	German 2 French 2			

SECOND SEMESTER

Mathematics 2, First Semester, hours to be arranged.

## CHEMICAL ENGINEERING COURSE—SOPHOMORE YEAR.

Day	8-9	9-10	10-11	11-12	P. M.
Monday	Chemistry 5 (First five weeks.) Chemistry 10 (Last twelve weeks)	Chemistry 5 (First five weeks.) Chemistry 10 (Last twelve weeks)	†Chemistry 5 (First five weeks) †Chemistry 10 (Last twelve weeks)	Military Sci. 3	Chemistry 5 (First five weeks) Chemistry 10 (Last twelve weeks) Chemistry 5 (First five weeks) Chemistry 10 (Last twelve weeks)
Tuesday	Mathematics 5	Chemistry 5 (First five weeks.) Chemistry 10 (Last twelve weeks)	Physics 1 Chemistry 5 (First five weeks) Chemistry 10 (Last twelve weeks)	German 3 Chemistry 5 (First five weeks) Chemistry 10 (Last twelve weeks)	Chemistry 5 (First five weeks) Chemistry 10 (Last twelve weeks)
Wednesday	Mathematics 5	Mathematics 5 (Last twelve weeks.)	Physics 1	German 3	Drawing 7
Thursday	Mathematics 5	Mathematics 5	Physics 1	German 3	Drawing 7
Friday	Mathematics 5	Military Sci. 11	†	†Military Sci. 3	Drawing 7
Saturday	Mathematics 5	Mathematics 5	Physics 1	German 3	

FIRST SEMESTER

Monday	Chemistry 6	Military Sci. 12	†	†Military Sci. 4	Chemistry 11
Tuesday	Mathematics 6	Chemistry 6	Physics 2	German 4	Chemistry 11
Wednesday	Mathematics 6	Chemistry 11	Chemistry 11	Chemistry 11	Chemistry 11
Thursday	Mathematics 6	Chemistry 6	Physics 2	German 4	Chemistry 11
Friday	Mathematics 6	Mathematics 6	†	†Military Sci. 4	Chemistry 11
Saturday	Mathematics 6	Mathematics 6	Physics 2	German 4	

SECOND SEMESTER

†These periods are transposed from December 1 to March 31.



## CHEMICAL ENGINEERING COURSE—JUNIOR YEAR.

Day	8-9	9-10	10-11	11-12	P. M.
FIRST SEMESTER					
Monday	Chemistry 8	Chemistry 19	Machine Design 3	Military Sci. 5	Chemistry 12
Tuesday	Chemistry 7	Chemistry 12	Chemistry 21	Chemistry 12	Chemistry 12
Wednesday	Chemistry 7	Chemistry 19	Machine Design 3		Chemistry 12
Thursday	Machine Design 3		Chemistry 21	Chemistry 12	Chemistry 8
Friday	Chemistry 12	Chemistry 12	Chemistry 12	Military Sci. 5	Chemistry 8
Saturday		Machine Design 3		Military Sci. 13	
SECOND SEMESTER					
Monday	Geology 1	Geology 1	Machine Design 5	Military Sci. 6 Chemistry 14 Chemistry 15 Chemistry 22	Chemistry 13
Tuesday	Machine Design 5		Chemistry 20		Chemistry 13
Wednesday	Machine Design 5	Chemistry 13	Chemistry 13	Chemistry 13 Chemistry 14 Chemistry 15 Chemistry 22	Physics 6
Thursday	Chemistry 13	Chemistry 13	Chemistry 20		Physics 6
Friday	Geology 1	Geology 1		Military Sci. 6 Chemistry 14 Chemistry 15 Chemistry 22 Military Sci. 14	Physics 6
Saturday	Chemistry 13	Chemistry 13	Machine Design 5		



## CHEMICAL ENGINEERING COURSE—SENIOR YEAR.

FIRST SEMESTER					
Day	8-9	9-10	10-11	11-12	P. M.
Monday	Elect. Eng. 21	Chemistry 23	Chemistry 23	Chemistry 23	Chemistry 23
Tuesday	Elect. Eng. 21	Elect. Eng. 21	Chemistry 21		Chemistry 23
Wednesday	Shop Work 15	Shop Work 15	Shop Work 15	Mech. Eng. 7	Chemistry 23
Thursday	Chemistry 23	Chemistry 23	Chemistry 21	Chemistry 23	Chemistry 23
Friday	Elect. Eng. 21	Mech. Eng. 7	Chemistry 23	Chemistry 23	Chemistry 23
Saturday	Mech. Eng. 7	Chemistry 16	Chemistry 16	Chemistry 16	
SECOND SEMESTER					
Monday	Chemistry 24	Chemistry 24	Chemistry 24	Chemistry 24 Chemistry 14 Chemistry 15 Chemistry 22	Chemistry 24
Tuesday	Political Sci. 1	Elect. Eng. 22	English 6		Chemistry 24
Wednesday	Elect. Eng. 22	Elect. Eng. 22	Chemistry 24	Chemistry 24 Chemistry 14 Chemistry 15 Chemistry 22	Chemistry 24
Thursday	Political Sci. 1		English 6		Chemistry 24
Friday	Elect. Eng. 22	Chemistry 24	Chemistry 24	Chemistry 24 Chemistry 14 Chemistry 15 Chemistry 22	Chemistry 24
Saturday	Political Sci. 1		English 6		

## ELECTRICAL AND MECHANICAL ENGINEERING COURSES—SOPHOMORE YEAR.

Day	8-9	9-10	10-11	11-12	P. M.
Monday	Machine Design 1	Military Sci. 11	†	†Military Sci. 3	Chemistry 4 Shop Work 3
Tuesday	Mathematics 5		Physics 1	German 3	Chemistry 4 Shop Work 3
Wednesday	Mathematics 5	Machine Design 1			Drawing 5 (Div. 1) (1st 7 wks.) Chemistry 4
Thursday	Mathematics 5	Mathematics 5	Physics 1	German 3	Drawing 5 (Div. 1) (1st 7 wks.) Drawing 6 (Div. 2)
Friday	Mathematics 5		†Machine Design 1	†Military Sci. 3	Drawing 5 (Div. 1) (1st 7 wks.) Drawing 6 (Div. 2)
Saturday	Mathematics 5	Mathematics 5	Physics 1	German 3	
Monday	Machine Design 2 (First ten weeks) Mech. Eng. 1 (Last seven weeks)		†	†Military Sci. 4	Shop Work 4
Tuesday	Mathematics 6	Machine Design 2 (First ten weeks) Mech. Eng. 1 (Last seven weeks)	Physics 2	German 4	Shop Work 4
Wednesday	Mathematics 6		Military Sci. 12		Drawing 8 Shop Work 4
Thursday	Mathematics 6		Physics 2 †Machine Design 2 (First ten weeks) †Mech. Eng. 1 (Last seven weeks)	German 4	Drawing 8
Friday	Mathematics 6	Mathematics 6		†Military Sci. 4	Drawing 8
Saturday	Mathematics 6	Mathematics 6	Physics 2	German 4	

†These periods are transposed from December 1 to March 31.

FIRST SEMESTER

SECOND SEMESTER

## ELECTRICAL ENGINEERING COURSE—JUNIOR YEAR.

FIRST SEMESTER					
Day	8-9	9-10	10-11	11-12	P. M.
Monday .....		Elect. Eng. 1	Machine Design 3	Military Sci. 5	Physics 3 Physics 4
Tuesday .....	Machine Design 4	Machine Design 4	Machine Design 4	Machine Design 4	Physics 3 Physics 4
Wednesday .....	Machine Design 4	Elect. Eng. 1	Machine Design 3	Mech. Eng. 7	Shop Work 9
Thursday .....	Machine Design 3	Machine Design 4	Machine Design 4	Machine Design 4	Machine Design 4
Friday .....	Machine Design 4	Mech. Eng. 7	Elect. Eng. 1	Military Sci. 5	Mech. Eng. 9
Saturday .....	Mech. Eng. 7	Machine Design 3	Mech. Eng. 9	Military Sci. 13	
SECOND SEMESTER					
Monday .....		Elect. Eng. 2	Machine Design 5	Military Sci. 6	Elect. Eng. 4
Tuesday .....	Machine Design 5	Shop Work 10	Shop Work 10	Shop Work 10	Mech. Eng. 10
Wednesday .....	Machine Design 5	Elect. Eng. 2	Mech. Eng. 8		Physics 5
Thursday .....	Elect. Eng. 4		Elect. Eng. 6	Mech. Eng. 8	Physics 5
Friday .....	Mech. Eng. 10	Mech. Eng. 8	Elect. Eng. 2	Military Sci. 6	Physics 5
Saturday .....			Machine Design 5	Military Sci. 14	

## ELECTRICAL ENGINEERING COURSE—SENIOR YEAR.

FIRST SEMESTER					
Day	8-9	9-10	10-11	11-12	P. M.
Monday	Elect. Eng. 15		Mech. Eng. 11	Military Sci. 7	Mech. Eng. 13
Tuesday	Mech. Eng. 12		Elect. Eng. 13		Elect. Eng. 15
Wednesday		Mech. Eng. 11	Elect. Eng. 11	Mech. Eng. 13	
Thursday	Mech. Eng. 12	Elect. Eng. 11	Mech. Eng. 11	Elect. Eng. 13	
Friday			Mech. Eng. 11	Military Sci. 7	Elect. Eng. 15
Saturday	Mech. Eng. 12	Elect. Eng. 11		Military Sci. 15	
SECOND SEMESTER					
Monday	Mech. Eng. 19	Elect. Eng. 12		Military Sci. 8	
Tuesday	Political Sci. 1		Mech. Eng. 14		Elect. Eng. 16
Wednesday			Elect. Eng. 12	Mech. Eng. 19	Mech. Eng. 14
Thursday	Political Sci. 1	Elect. Eng. 12			Elect. Eng. 16
Friday		Elect. Eng. 12	Mech. Eng. 19	Military Sci. 8	
Saturday	Political Sci. 1			Military Sci. 16	

## MECHANICAL ENGINEERING COURSE—JUNIOR YEAR.

Day	8-9	9-10	10-11	11-12	P. M.
Monday .....		Elect. Eng. 1	Machine Design 3	Military Sci. 5	Physics 3 Physics 4
Tuesday .....	Machine Design 4	Machine Design 4	Machine Design 4	Machine Design 4	Physics 3 Physics 4
Wednesday .....	Machine Design 4	Elect. Eng. 1	Machine Design 3	Mech. Eng. 7	Shop Work 9
Thursday .....	Machine Design 3	Machine Design 4	Machine Design 4	Machine Design 4	Machine Design 4
Friday .....	Machine Design 4	Mech. Eng. 7	Elect. Eng. 1	Military Sci. 5	Mech. Eng. 9
Saturday .....	Mech. Eng. 7	Machine Design 3	Mech. Eng. 9	Military Sci. 13	

FIRST SEMESTER

Day	8-9	9-10	10-11	11-12	P. M.
Monday .....		Elect. Eng. 2	Machine Design 5	Military Sci. 6	Machine Design 6
Tuesday .....	Machine Design 5	Shop Work 10	Shop Work 10	Shop Work 10	Mech. Eng. 10
Wednesday .....	Machine Design 5	Elect. Eng. 2	Mech. Eng. 8	Machine Design 6	Physics 5
Thursday .....	Machine Design 6	Machine Design 6	Machine Design 6	Mech. Eng. 8	Physics 5
Friday .....	Mech. Eng. 10	Mech. Eng. 8	Elect. Eng. 2	Military Sci. 6	Physics 5
Saturday .....	Machine Design 6	Machine Design 6	Machine Design 5	Military Sci. 14	

SECOND SEMESTER

## MECHANICAL ENGINEERING COURSE—SENIOR YEAR.

FIRST SEMESTER					
Day	8-9	9-10	10-11	11-12	P. M.
Monday .....	Mech. Eng. 15	Elect. Eng. 19	Mech. Eng. 11	Military Sci. 7	Mech. Eng. 13
Tuesday .....	Mech. Eng. 12	Mech. Eng. 15	Mech. Eng. 15	Mech. Eng. 15	
Wednesday .....	Mech. Eng. 15	Mech. Eng. 11	Elect. Eng. 19	Mech. Eng. 13	Mech. Eng. 15
Thursday .....	Mech. Eng. 12		Mech. Eng. 11		Elect. Eng. 17
Friday .....		Elect. Eng. 19	Mech. Eng. 11	Military Sci. 7	
Saturday .....	Mech. Eng. 12	Mech. Eng. 15	Mech. Eng. 15	Mech. Eng. 15	
SECOND SEMESTER					
Monday .....	Mech. Eng. 19		Elect. Eng. 20	Military Sci. 8	Thesis
Tuesday .....	Political Sci. 1	Mech. Eng. 17	Mech. Eng. 14		Thesis
Wednesday .....	Elect. Eng. 20	Mech. Eng. 16		Mech. Eng. 19	Mech. Eng. 14
Thursday .....	Political Sci. 1	Thesis	Thesis	Thesis	Mech. Eng. 16
Friday .....		Mech. Eng. 16	Mech. Eng. 19	Military Sci. 8	Mech. Eng. 16
Saturday .....	Political Sci. 1	Mech. Eng. 17			

## GENERAL COURSE—FRESHMAN YEAR.

Day	8-9	9-10	10-11	11-12	P. M.
Monday		Mathematics 1 French 1 German 1	Chemistry 1	Military Sci. 1	*Drawing 1
Tuesday	English 1	History 1 or History 3	Mathematics 1	Military Sci. 9	*Drawing 1
Wednesday		French 1 German 1	Chemistry 1	Mathematics 1	*Shop Work 1 History 1 or History 3
Thursday	English 1	History 1 or History 3	Chemistry 1	Military Sci. 1	*Shop Work 1
Friday		French 1 German 1	Mathematics 1	Mathematics 1	
Saturday	English 1				

FIRST SEMESTER

Monday	Military Sci. 10	*Philosophy 2	Chemistry 2	Military Sci. 2	Drawing 16 (Last seven weeks) Mathematics 4 (Last seven weeks)
Tuesday	English 2	French 2 German 2		Mathematics 3 (First ten weeks)	Drawing 16 (Last seven weeks) Mathematics 4 (Last seven weeks)
Wednesday		History 2 or History 4	*Philosophy 2	Mathematics 3 (First ten weeks)	Drawing 16 (Last seven weeks) Mathematics 4 (Last seven weeks)
Thursday	English 2	French 2 German 2	Mathematics 3 (First ten weeks)	Mathematics 3 (First ten weeks)	History 2 or History 4
Friday		History 2 or History 4	Chemistry 2	Military Sci. 2	Drawing 16 (Last seven weeks) Mathematics 4 (Last seven weeks)
Saturday	English 2	French 2 German 2	Mathematics 3 (First ten weeks)	Mathematics 3 (First ten weeks)	

SECOND SEMESTER

\*Elective.  
Mathematics 2, First Semester, hours to be arranged.



## GENERAL COURSE—SOPHOMORE YEAR.

FIRST SEMESTER					SECOND SEMESTER						
Day	8-9	9-10	10-11	11-12	P. M.	Day	8-9	9-10	10-11	11-12	P. M.
Monday	†Zoology 6	Military Sci. 11 ‡Zoology 1 ‡Zoology 6	††Botany 1 *Philosophy 1 *Physics 1	†Military Sci. 3	*Chemistry 4	Monday		†Zoology 2	††Botany 2 English 6 *Physics 2	†Military Sci. 4	†Botany 2 ‡Zoology 5
Tuesday	*Mathematics 5	*History 1 *History 3	†Botany 1	German 3	*Chemistry 4	Tuesday	*Mathematics 6	Political Sci. 1 *History 2 *History 4	Military Sci. 12 English 6 *Physics 2	German 4	†Botany 2 ‡Zoology 5 *History 2 *History 4
Wednesday	*Mathematics 5 ‡Zoology 1	†Zoology 1 *History 1 or *History 3	*Philosophy 1 *Physics 1	†Botany 1	*Chemistry 4 *History 1 *History 3	Wednesday	*Mathematics 6	Political Sci. 1 *History 2 *History 4	German 4	German 4	*History 2 ‡Zoology 2
Thursday	*Mathematics 5	*Mathematics 5	†	German 3	‡Zoology 1 ‡Zoology 6	Thursday	*Mathematics 6				
Friday	*Mathematics 5	*Mathematics 5	*Philosophy 1 *Physics 1	†Military Sci. 3		Friday	*Mathematics 6				
Saturday	†Botany 1	†Botany 1		German 3		Saturday	*Mathematics 6	Political Sci. 1		German 4	

†These periods are transposed from December 1 to March 31.

‡Students are required to select for 1st Semester, Zoology 1 or 6, or Botany 1, and for 2nd Semester, Zoology 2 or 5, or Botany 2  
\*Elective.

# GENERAL COURSE—JUNIOR YEAR.

## AND THE MECHANIC ARTS.

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Day	8-9	9-10	10-11	11-12	P. M.
Monday	Zoology 6	French 3 Political Sci. 2 Zoology 6	English 3	Philosophy 4 Military Sci. 5	Botany 3 4 Chemistry 1 Spanish 1 Zoology 3
Tuesday	Zoology 8	French 3	History 5 Botany 3 Zoology 3	Philosophy 4 English 3	Chemistry 4 Spanish 1 Chemistry 4 Spanish 1
Wednesday			History 5 Botany 3 Zoology 3		Botany 3 4 Zoology 3 Zoology 6
Thursday	Zoology 8	Political Sci. 2	History 5 Botany 3 Zoology 3	Philosophy 4 Military Sci. 5	English 3
Friday		French 3	History 5		
Saturday	Zoology 8	Political Sci. 2			

FIRST SEMESTER

Monday	Chemistry 6 Geology 1	French 4 Mathematics 9 Chemistry 6 Philosophy 3	Geology 2 History 6 English 6	Philosophy 5 Military Sci. 6 Political Sci. 4 Political Sci. 5	Spanish 2 English 4 Spanish 2
Tuesday					
Wednesday		French 4 Mathematics 9	History 6	Philosophy 5 Geology 2	Spanish 2
Thursday		Chemistry 6 Philosophy 3	English 6	Political Sci. 4 Political Sci. 5	English 4 Geology 2
Friday	Geology 1	French 4	History 6	Philosophy 5 Military Sci. 6	English 4
Saturday		Philosophy 3	English 6	Political Sci. 4 Political Sci. 5 Military Sci. 14	

SECOND SEMESTER

For hours of courses not scheduled, see instructor.  
All elective.

## GENERAL COURSE--SENIOR YEAR.

Day	8-9	9-10	10-11	11-12	P. M.
Monday	German 5	Zoology 6 Philosophy 6	French 5	Philosophy 4 Political Sci. 3	Botany 6 History 7 Spanish 1
Tuesday	English 5 Zoology 8	Political Sci. 2 Zoology 6	French 9 Philosophy 1		
Wednesday	German 5	Philosophy 6 Meteorology 1	Botany 6 French 5 French 9 German 9	Philosophy 4 Political Sci. 3	Spanish 1 History 7 Spanish 1
Thursday	English 5	Zoology 8 Political Sci. 2	Philosophy 1		Zoology 6
Friday	German 5	Philosophy 6 Meteorology 1	French 5	Philosophy 4 Political Sci. 3	Botany 6 History 7
Saturday	English 5 Zoology 8	Political Sci. 2	German 9 Philosophy 1		
Monday	German 6	Mathematics 9	French 6 Geology 2	Philosophy 5 English 7	Spanish 2
Tuesday		Philosophy 3	French 10	Political Sci. 4 or Political Sci. 5	English 4 Spanish 2
Wednesday	German 6	Mathematics 9	French 6	Philosophy 5 English 7	Spanish 2
Thursday		Philosophy 3	German 10 French 10	Geology 2 Political Sci. 4 or Political Sci. 5	English 4 Geology 2
Friday	German 6		French 6	Philosophy 5 English 7	English 4 English 7
Saturday		Philosophy 3	German 10	Political Sci. 4 or Political Sci. 5	

For hours of courses not scheduled, see instructor.  
All elective

FIRST SEMESTER

SECOND SEMESTER

## TWO YEAR COURSE IN AGRICULTURE.

This course was established by the state legislature in 1895, and provides an opportunity for those students to secure a training for their life work who do not have the time, money or preparation to take a four year college course.

The course is especially arranged and suited for the young, bright boys of the farm, who expect to make a business of some line of agricultural or horticultural work. Although it is open to students who have had no previous training on the farm, the entrance of such is not encouraged because of their lack of practical experience. By independent work and close application, however, inexperienced students sometimes pass the course with credit.

Three new and important changes in the course have been made this year. The first is the shortening of the school year from thirty-five to thirty weeks. This change is made for the purpose of having the students complete their year's work about the last of April so as to be able to go home for the spring work on the farm or to accept salaried positions for the summer. It also permits of more than four months' time for those students who are dependent upon their own resources to earn money for the following year. The second change is the separation of the two and four year classes all the way through the course. This separation has not heretofore been made in most of the agricultural and horticultural subjects, but with an increased teaching force in these two departments for the coming year, it is made complete. The making of the classes separate and distinct makes it possible to plan and give the work of the two year course in a manner best suited to the needs of its students. In short, the course has been made just as practical as possible. The third change is the division of the year into two terms instead of three. The first term will be eighteen weeks in length and the second twelve.

The work of the first year is largely preparatory, being a study of the sciences underlying agriculture, together with some elementary agricultural and horticultural work. The second year contains optional studies so that it is possible for students to specialize in animal industry, dairying, forestry or greenhouse work. Ten hours per week on the average are spent in practical work on the farm, in the barn, greenhouses or shops.

### ADMISSION.

The course is open to those who can pass a fair and reasonable examination in reading, spelling, writing, arithmetic, English grammar, geography and history of the United States. Applicants, unless over eighteen years of age, who do not bring high school or other satisfactory certificates to show their proficiency in these subjects, will be given an entrance examination on Tuesday afternoon and Wednesday morning of the opening week of school. Applicants who are over eighteen years of age will be admitted without examination.

### OPENING.

The course for the year will open Wednesday, September 17, 1908, and close Wednesday, May 5, 1909. A Christmas vacation of two weeks and a spring vacation of five days will be given.

### EXPENSES.

The expenses of the course will vary with the tastes and frugality of the students and the kind of accommodations which they secure. The total average expense for the year is not far from \$250. Many students by working for their board or room rent, or by doing various kinds of work about the college or village, are able to go through the year with a cash outlay not exceeding \$150.

### CERTIFICATES.

No degree is given at the end of the course, but a certificate of graduation is issued upon the completion of it or its equivalent.

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## DESCRIPTION OF STUDIES.

### AGRONOMY.

#### 31. Elementary Agriculture.

Text-book and recitations upon the elementary principles of Agriculture, including a study of the soil, the plant and the animal, and their relations to each other; also a brief study of the different breeds of livestock, their breeding and feeding. For Two Year Agricultural Students, First Year.

*Three exercises per week. 1st 3.*

**32. Farm Equipment and Farm Crops.**

This course is similar to Agronomy 1, although less detailed. For Two Year Agricultural Students, Second Year.

*Three exercises per week. 1st S.*

**33. Soils and Soil Physics.**

This course is similar to Agronomy 2, but involves less mathematics and physics. For Two Year Agricultural Students, Second Year.

*Three exercises per week. 2nd S.*

**34. Manures and Fertilizers.**

Text-book and recitations upon the constituents of farm manures, and chemical fertilizers, the care and application of manures, the mixture of fertilizers and the modifications required by different soils and crops. For Two Year Agricultural Students, Second Year.

*Two exercises per week. 2nd S.*

**ANIMAL HUSBANDRY.****31. Breeds of Live Stock.**

Similar to An. Husb. 1. For Two Year Agricultural Students, Second Year.

*Three exercises per week. 1st S.*

**32. Sheep Raising.**

Lectures and recitations upon the breeds of sheep; their adaptability to this section; their care and management; their fitting for the shows and feeding for market purposes; the growing of hot house lambs. Also practical exercises in judging the various breeds. Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 1st S.*

**33. Feeds and Feeding.**

Similar to An. Husb. 3. For Two Year Agricultural Students, Second Year.

*Three exercises per week. 2nd S.*

**34. Animal Breeding.**

Similar to An. Husb. 2. Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 2nd S.*



**35. Veterinary.**

Similar to An. Husb. 4. Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 2nd S.*

**36. Poultry.**

Similar to An. Hus. 5. Elective for Two Year Agricultural Students, Second Year.

*Two exercises per week. 2nd S.*

**BOTANY.**

PROF. BROOKS, MR. LEWIS.

**31. Elements of Botany.**

A general view of the life processes and structure of plants, followed by the study in detail of a few type forms. Recitations and laboratory work. For Two Year Agricultural Students, First Year.

*Three exercises per week. 1st S.*

**32. Plant Diseases.**

A study of the more important fungous diseases and their prevention. Lectures, recitations and laboratory work.

*Open only to students who have completed Course 1.*

*Three exercises per week. 2nd S.*

**CHEMISTRY.**

PROF. MORSE.

**31. Elementary Applications.**

An elementary course, with special reference to the elements of plant food, composition of fertilizers, elements subject to exhaustion in soils, etc. For Two Year Agricultural Students, First Year.

*Two exercises per week. 2nd S.*

**DAIRYING.**

ASSOC. PROF. RASMUSSEN.

**31. Milk and Milk Testing.**

Lectures and recitations on the secretion, composition and properties of milk, the Babcock test and lactometer. Comparative



study of different systems of creaming and different factors influencing the efficiency of the hand separator. For Two Year Agricultural Students, First Year.

*Three exercises per week. 2nd S.*

### 32. Butter Making.

This includes pasteurization, commercial starters, cream ripening, churning, marketing and scoring butter. Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 1st S.*

### 33. Technology of Milk.

Same as Course 3. Elective for Two Year Agricultural Students, Second Year.

*Two exercises per week. 2nd S.*

## DRAWING.

### 31. Two Year Agricultural Students, Second Year.

*One exercise per week. 1st S.*

## ENGLISH.

### 31. Grammar and Elementary Composition.

For Two Year Agricultural Students, First Year.

*Three exercises per week. 1st S.*

### 32. Grammar and Composition.

This is a continuation of Course 31. For Two Year Agricultural Students, First Year.

*Open only to students who have completed Course 31.*

*Three exercises per week. 2nd S.*

## FORESTRY.

### 31. Farm Forestry.

Method of reproduction, seed collecting, thinning, determination of heights, contents and increment of forest trees. For Two Year Agricultural Students, First Year.

*Two exercises per week. 2nd S.*

### 32. Arboriculture and Forestry.

Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 2nd S.*

**HORTICULTURE.****31. Vegetable Gardening.**

A study of the commercial methods of vegetable growing. Special attention is given to the home garden. For Two Year Agricultural Students, First Year.

*Three exercises per week. 1st S.*

**32. Fruit Growing.**

This course embraces a study of commercial orcharding; each fruit being studied with reference to planting, cultivating, pruning, fertilizing, picking, packing, storing and marketing. For Two Year Agricultural Students, Second Year.

*Three exercises per week. 1st S.*

**33. Plant Growth and Greenhouse.**

Combined lecture, demonstration and laboratory course in plant growth and greenhouse management. Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 1st S.*

**34. Home Decoration.**

A study of ornamental trees, shrubs and flowers; their culture, proper arrangement and decorative value, with special reference to home surroundings. Elective for Two Year Agricultural Students, Second Year.

*Three exercises per week. 2nd S.*

**MATHEMATICS.**

MR. EASTMAN.

**31. Arithmetic and Bookkeeping.**

For Two Year Agricultural Students, First Year.

*Three exercises per week. 1st S.*

**MILITARY SCIENCE AND TACTICS.**

CAPT. HUNT.

**1. Military Drill.**

For Two Year Agricultural Students, First Year.

*Two exercises per week. 1st S.*

**2. Military Drill.**

For Two Year Agricultural Students, First Year.

*Two exercises per week. 2nd S.*

## 3. Military Drill.

For Two Year Agricultural Students, Second Year.

*Two exercises per week. 1st S.*

## 4. Military Drill.

For Two Year Agricultural Students, Second Year.

*Two exercises per week. 2nd S.*

## 9. Infantry Drill Regulations.

Practical instruction and lectures. For Two Year Agricultural Students, First Year.

*One exercise per week. 1st S.*

## 10. Manual of Guard Duty and Small Arms Firing Regulations.

For Two Year Agricultural Students, First Year.

*One exercise per week. 2nd S.*

## 17. Lectures on Advance Guards, Outposts, etc.

For Two Year Agricultural Students, Second Year.

*One exercise per week. 1st S.*

## 18. Lectures on Advance Guards, Outposts, etc.

Continuation of Course 17. For Two Year Agricultural Students, Second Year.

*One exercise per week. 2nd S.*

## PHYSICS.

PROF. NESBIT.

## 31. Elementary Physics.

For Two Year Agricultural Students, Second Year.

*Four exercises per week. 1st S.*

## SHOP WORK.

## 31. Wood Work. Mr. Ingham.

For Two Year Agricultural Students, First Year.

*Two exercises per week. 2nd S.*

## 32. Iron Work. Mr. Brown.

For two Year Agricultural Students, Second Year.

*Two exercises per week. 2nd S.*

## ZOOLOGY.

## 31. Vertebrate Anatomy and Physiology.

The anatomy and physiology of the higher vertebrates based upon that of man and with special reference to domestic animals.

Recitations and laboratory dissections and experiments. For Two Year Agricultural Students, First Year.

*Three exercises per week. 1st S.*

### 32. Elementary Entomology.

The structure, habits and classification of insects, with special consideration of injurious pests and means of controlling them. For Two Year Agricultural Students, First Year.

*Three exercises per week. 2nd S.*

## COURSES OF STUDY AND SCHEDULE OF HOURS.

### First Year.

#### FIRST SEMESTER.

	Credit hours.
<i>Agronomy 31</i>	Elementary Agriculture ..... 3
<i>Botany 31</i>	Elements of Botany ..... 3
<i>English 31</i>	Grammar and Elementary Composition ..... 3
<i>Horticulture 31</i>	Vegetable Gardening..... 3
<i>Mathematics 31</i>	Mathematics and Bookkeeping... 3
<i>Military Science 1</i>	Drill ..... 1
<i>Military Science 9</i>	Infantry Drill Regulations..... 1
<i>Zoology 31</i>	Vertebrate Anatomy and Physiology ..... 3

#### SECOND SEMESTER.

<i>Botany 32</i>	Plant Diseases ..... 3
<i>Chemistry 31</i>	Elementary Applications..... 2
<i>Dairying 31</i>	Milk and Milk Testing..... 3
<i>English 32</i>	Grammar and Composition..... 3
<i>Forestry 31</i>	Farm Forestry ..... 2
<i>Military Science 2</i>	Drill ..... 1
<i>Military Science 10</i>	Manual of Guard Duty..... 1
<i>Shop Work 31</i>	Wood Work ..... 2
<i>Zoology 32</i>	Economic Entomology ..... 4

### Second Year.

#### FIRST SEMESTER.

<i>Agronomy 32</i>	Farm Equipment and Farm Crops 3
<i>An. Husb. 31</i>	Breeds of Livestock..... 3

	Credit hours.
<i>*An. Husb. 32</i>	Sheep Raising ..... 3
<i>*Dairying 32</i>	Butter Making ..... 3
<i>Drawing 31</i>	..... 1
<i>Horticulture 32</i>	Fruit Growing ..... 3
<i>*Horticulture 33</i>	Plant Growth and Greenhouse... 3
<i>Military Science 3</i>	Drill ..... 1
<i>Military Science 17</i>	Advance Guards, Outposts, etc... 1
<i>Physics 31</i>	Elementary Physics ..... 4

## SECOND SEMESTER.

<i>Agronomy 33</i>	Soils and Soil Physics..... 3
<i>Agronomy 34</i>	Manures and Fertilizers..... 2
<i>An. Husb. 33</i>	Feeds and Feeding ..... 3
<i>*An. Husb. 34</i>	Animal Breeding ..... 3
<i>*An. Husb. 35</i>	Veterinary Science ..... 3
<i>*An. Husb. 36</i>	Poultry ..... 2
<i>*Dairying 33</i>	Technology of Milk ..... 2
<i>*Forestry 32</i>	Arboriculture and Forestry.... 3
<i>Horticulture 34</i>	Home Decoration ..... 3
<i>Military Science 4</i>	Drill ..... 1
<i>Military Science 18</i>	Advance Guards, Outposts, etc... 1
<i>Shop Work 32</i>	Iron Work ..... 2

\* Elective. Elect any one or two.

## TWO YEAR COURSE IN AGRICULTURE—FIRST YEAR.

DAY	8-9	9-10	10-11	11-12	P. M.
Monday.....	English 31	Agonomy 31	†Mathematics 31	‡Military Sci. 1	Horticulture 31
Tuesday.....		Military Sci. 9	Horticulture 31	Botany 31	Zoology 31
Wednesday.....	English 31	Agonomy 31	Mathematics 31	Zoology 31	Botany 31
Thursday.....		Horticulture 31		Zoology 31	
Friday.....	English 31	Agonomy 31	†Mathematics 31	‡Military Sci. 1	Botany 31
Saturday .....					
FIRST SEMESTER					
Monday.....	English 32	Chemistry 31	†Forestry 31	‡Military Sci. 2.	Botany 32
Tuesday.....	Shop 31	Shop 31	Shop 31	Shop 31	Zoology 32
Wednesday.....	English 32	Chemistry 31		Zoology 32	Forestry 31
Thursday.....	Dairying 31	Dairying 31	Dairying 31	Botany 32	Zoology 32
Friday.....	English 32	Military Sci. 10	†Dairying 31	‡Military Sci. 2	Botany 32
Saturday .....	Dairying 31	Dairying 31	Dairying 31	Zoology 32	
SECOND SEMESTER					

†These periods are transposed from December 1 to March 31.

## TWO YEAR COURSE IN AGRICULTURE—SECOND YEAR

FIRST SEMESTER					
DAY	8-9	9-10	10-11	11-12	P. M.
Monday .....	An. Husb. 32 *Horticulture 33	Horticulture 32	†Dairying 32	†Military Sci. 3	An. Husb. 31
Tuesday .....	*Dairying 32	*Dairying 32	Agronomy 32	Physics 31	*Horticulture 33
Wednesday.....	*Horticulture 33	Horticulture 32	An. Husb. 31	Physics 31	Agronomy 32
Thursday .....	*An. Husb. 32	*An. Husb. 32	Agronomy 32	Physics 31	Drawing 31
Friday .....	Military Sci. 17	*An. Husb. 32	†An. Husb. 31	†Military Sci. 3	Horticulture 32
Saturday.....	*Dairying 32	*Dairying 32	*Dairying 32	Physics 31	
SECOND SEMESTER					
Monday .....	Agronomy 34	*An. Husb. 35	†Agronomy 33	†Military Sci. 4	*Forestry 32 *An. Husb. 36
Tuesday .....	Military Sci. 18	*An. Husb. 34	Agronomy 33		*Dairying 33
Wednesday .....	Agronomy 34	*Horticulture 34		*Forestry 32	Agronomy 33
Thursday .....	Shop 32	Shop 32	Shop 32	Shop 32	An. Husb. 33
Friday .....	An. Husb. 33	*Horticulture 34 *An. Husb. 34	†	†Military Sci. 4	*Horticulture 34 *An. Husb. 35
Saturday.....	An. Husb. 33	*Dairying 33 *An. Husb. 34	*Dairying 33	*Forestry 32 *An. Husb. 36	

\* Elective.

†These periods are transposed from December 1 to March 31.



## TEN WEEK COURSE IN DAIRYING OR DAIRY SCHOOL.

### OPENING.

The Fourteenth Annual Dairy School of the New Hampshire College opens Tuesday, January 5, and closes Friday, March 13. Students should present themselves for registration at Thompson Hall the first day of the session. Lectures and laboratory work begin the following day.

### ADMISSION.

The school is open to men and women sixteen years of age and upward. No entrance examination is required. However, in order to make the best use of the instruction, the student should have a good common school education. The experiences of previous years have shown that the subject in which the student is most deficient is arithmetic, especially percentage and decimals. Both of these divisions of arithmetic are used to a large extent in solving problems in the creamery and also in computing rations for the dairy cow. It is therefore well for those planning to take the dairy course to review these subjects before entering. To be most benefited by the school, the students should have had some practical experience on a farm or in a creamery.

### EXPENSES.

A tuition fee of five dollars is payable on registering at the beginning of the term; other expenses, including books, white suits, and room and board for ten weeks, amount to approximately sixty dollars.

### CERTIFICATES.

Students completing the required work of the dairy school, and passing satisfactory examinations, will be given certificates.

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## DESCRIPTION OF SUBJECTS.

Associate Professor W. H. PEW.

### Agriculture 42. Breeds of Dairy Cattle.

Lectures and recitations upon the origin, history, distribution, characteristics, adaptability and standard of excellence of the pedigreed breeds of cattle, with special reference to the selection

of breeds and individual animals for the herd. This subject will be studied four hours per week for the first five weeks. The practical work will consist of scoring and judging representatives of the various breeds of dairy cattle, and in tracing pedigrees of animals in the herd books of the different breeds.

**Professor FRED W. MORSE.**

**Agriculture 43. Chemistry of Dairy Products.**

The subject is taken up in a course of eight lectures, illustrated by experiments and specimens, and includes the properties and separation of the different constituents of milk, fat, casein, albumen, sugar, etc., the composition of butter and butter-fat, and the properties and effects of preservatives.

**Associate Professor W. H. PEW.**

**Agriculture 44. Diseases of Cattle.**

This course will consist of eight lectures and recitations upon the anatomy and physiology of the cow, with special reference to the digestive, reproductive and milk-producing organs. The common diseases, their causes and the methods of treatment will be discussed.

**Agriculture 45. Feeds and Feeding.**

Lectures and recitations upon the composition and digestibility of feeding stuffs, the preservation of coarse fodders, the making and feeding of ensilage, and the grinding, steaming and cooking of feed. A careful study will be made of the different grains and feeds, and their value in a ration for dairy cows. Practice will be given in computing rations for the dairy cow.

**Professor F. W. TAYLOR.**

**Agriculture 50. Forage and Silage Crops.**

This course will consist of ten lectures upon forage and silage crops which are suited for New Hampshire conditions. The matter of varieties, preparation of the ground, time of seeding, amount of seed, harvesting and storing will be discussed. Soiling crops, the construction of silos and the growing of crops for the silo will be treated in as much detail as the time allows.

**Associate Professor FRED RASMUSSEN.**

**Dairying 40. Butter Making.**

Lectures and recitations on the different systems of creaming milk and a comparison of the efficiency of different cream separ-

ators under varying conditions; cream ripening, churning, washing, marketing and scoring of butter.

**Dairying 41. Dairy Bacteriology.**

Lectures and demonstrations on the functions of bacteria and the application of bacteriological principles to dairy work, such as pasteurization, cream ripening, commercial starters, and deterioration of butter.

**Dairying 42. Dairy Laboratory.**

The equipment in the dairy building is such that the laboratory work can be made applicable both to farm and factory conditions. The student will have an opportunity to study construction and efficiency, and operation of the various machines used in the handling of milk and making of butter. The use of the Babcock test in apportioning the money value of milk is now regulated by state law, and the importance of the test in the successful management of the dairy herd has created a demand for more complete and practical training. The details of the test will be studied carefully, and the student will practice testing milk, cream, skim-milk and butter-milk until fully competent to perform the work for himself or for others.

**Dairying 44. Milk and Milk Testing.**

This course will consist of the study of secretion, the physical and chemical properties of milk; the production and preparation of sanitary, certified and modified milk, the various methods of sampling and testing milk and cream, and the detection of adulterants and preservatives.

**Mechanical Engineering 40. Boilers and Engines.**

Lectures will be given on the construction, operation and care of boilers, motors, steam and gasoline engines. The lectures will be followed by practical demonstration and practice in the management of the various motive powers. Instruction and practice will also be given in pipe cutting and fitting, and other work incidental to the management of a steam plant. The course will consist of a two-hour period once a week for the ten weeks.

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NEW HAMPSHIRE  
AGRICULTURAL EXPERIMENT STATION.

Most of the Agricultural Experiment Stations of the various states, including that of New Hampshire were founded in 1888 by an act of Congress, approved March 2, 1887, known as the

Hatch Act in honor of its author. This act appropriated fifteen thousand dollars (\$15,000) annually for the maintenance of an Agricultural Experiment Station in each state. This act provides—

“That it shall be the object and duty of said Experiment Stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural and artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective states and territories.” The act also provides that the results of such work shall be published in bulletins and reports.

A further endowment of the Experiment Stations to provide specifically for research work was made by the Adams Act passed by Congress and approved March 16, 1906, which provided an increased annual appropriation which amounts to \$11,000 for the current fiscal year and increases to \$15,000 in 1911-'12. This appropriation is specifically limited to the “necessary expenses of conducting original researches or experiments,” and the rulings of the U. S. Department of Agriculture, which is vested with the supervision of the expenditures under this act, require that this appropriation be spent in fundamental investigations or researches to determine the underlying causes and principles of agricultural science, rather than for mere experiments to secure results of immediate practical application as contemplated under the Hatch Act Appropriation. The purposes of the two acts are therefore supplementary but distinct.

The New Hampshire Agricultural Experiment Station is organized as a department of the New Hampshire College of Agriculture and Mechanic Arts, and is administered by a Board of Control, elected by its Board of Trustees.

The publications of the station comprise 139 bulletins of the regular series and seven circulars. The bulletins are issued at irregular intervals and are sent to all residents of New Hampshire requesting them. Back numbers will be sent as long as the supply lasts.

The station is prepared to give advice and assistance to the farmers of New Hampshire along the following lines:

The maintenance of soil fertility, including the rotation of crops and the selection and use of manures and fertilizing materials.

The selection of varieties of grains, grasses and forage crops and methods of culture.

The selection of varieties of fruits and vegetables and the management of orchards.

The examination of seeds that are suspected of being unsound or adulterated; the identification of grasses, weeds and other plants; the prevention of fungous diseases of plants.

The identification of insects and the control of such as are injurious.

The feeding of animals, including calculation of rations and use of various feeding stuffs.

The methods of milk production, creamery and dairy methods and machinery and the scoring of dairy products.

The testing of milk to determine the value of dairy cows.

The planting and care of forest trees and the management of farm wood lots.

Any citizen of New Hampshire has the right to apply to the station for such assistance as it can give, and all such requests will be given prompt attention.

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## COMMENCEMENT 1908.

On Commencement Day, June 3, 1908, the following degrees were conferred:

### BACHELORS OF SCIENCE.

#### Agriculture.

Carlisle, Lawrence A., Exeter.

Farwell, Oren L., Chesham.

Sanborn, Moses H., Fremont.

Waite, George L., Dunbarton.



**Chemistry.**

Evans, Walter W., E. Kingston.  
French, Harry F., Plymouth.  
Perley, George A., Goffstown.

**Electrical Engineering.**

Barton, Arthur Hosea, Newport.  
Batchelder, Arthur M., Suncook.  
Buss, Minot G., Wilton.  
Clough, Francis, Contoocook.  
Cone, Charles F., Nashua.  
Cory, Merton M., Nashua.  
Huse, Merrit C., Concord.  
O'Connor, John J., Portsmouth.  
Priest, James H., Manchester.  
Walker, Harold D., Kittery, Maine.

**General.**

Chesley, Mary C., Durham.  
DeMeritt, Katharine, Durham.  
Page, John C., Dover.  
Pettee, Sarah E., Durham.

**Mechanical Engineering.**

Croghan, John T., Concord.  
Kirkpatrick, William R., Nashua.  
Smalley, Dean F., Walpole.  
Tarbell, Carl B., Milton.  
Wadleigh, Ray E., Kensington.

**Unclassified.**

Adams, Waldo L., Townsend, Mass.  
Cash, James D., Massabesic.  
Hill, Stanley F., Nashua.  
Woodman, Francis W., W. Derry.

**Certificates.**

Holmes, George A., Langdon.  
Leavitt, Guy, Sanbornton.  
Littlefield, Harold T., Salem Depot.

**PRIZE RECORD FOR 1908.****BAILEY PRIZE—\$10.**

**GIVEN BY DR. C. H. BAILEY OF THE CLASS OF '79, AND E. A. BAILEY  
OF THE CLASS OF '85.**

GEORGE ARTHUR PERLEY, Goffstown.

**ERSKINE MASON MEMORIAL PRIZE.**

GEORGE ARTHUR PERLEY, Goffstown.

**SENIOR STANDING HIGHEST IN THE MILITARY  
DEPARTMENT.**

JOHN TIMOTHY CROGHAN, Concord.

**WINNERS OF INDIVIDUAL PRIZE DRILL.  
GOLD MEDAL.**

JOHN WORTHEN DAVIS, '11, Concord.

**SILVER MEDAL.**

CHARLES F. WHITTEMORE, '11, Pembroke.

**HONORABLE MENTION.**

CHARLES HUBERT LOCKE, '11, Wakefield, Mass.

**PRIZE SWORD—EXCELLENCE IN DRILL.**

HAROLD HARTSHORN WILKINS, '09, Amherst.

**HONORABLE MENTION.**

CARL DUNCAN KENNEDY, '09, Concord.

**SENIORS REPORTED TO ADJT.-GENERAL, U. S. ARMY, FOR  
APTITUDE IN DRILL.**

JOHN TIMOTHY CROGHAN, Concord.

MERRITT CHASE HUSE, Concord.

HAROLD DUNCAN WALKER, Kittery, Me.

**COLOR COMPANY—FALL TERM.**

COMPANY B.

**VALENTINE SMITH SCHOLARSHIPS.**

WILLIAM S. CAMPBELL, '09.

EDWARD D. FRENCH, '10.

EARLE B. JENNINGS, '11.

PHILIP L. GOWEN, '12.



# ROSTER OF BATTALION.

FOR 1908-'09.

## COMMANDANT.

CAPTAIN WILLIAM E. HUNT, Twenty-Second U. S. Infantry.

## CADET OFFICERS.

MAJOR C. D. KENNEDY.

FIRST LIEUT. AND ADJT. L. S. MORRISON.

FIRST LIEUT. AND Q. M. H. E. WILDER.

SERGT. MAJ. C. S. WRIGHT.

Q. M. SERGT. H. P. CORLISS.

COLOR SERGT. C. E. LAWRENCE.

DRUM MAJOR W. F. LANCELIER.

## COMPANY A.

CAPT. H. H. WILKINS,

1ST LT. R. A. NEAL.

2ND LT. J. M. LEONARD.

## COMPANY B.

CAPT. L. L. SMALLEY.

1ST LT. C. CHASE.

2ND LT. H. P. CORSON.

## COMPANY C.

CAPT. L. A. PRATT.

1ST LT. F. O. CHASE.

2ND LT. A. E. BLAKE.

## FIRST SERGEANTS.

E. H. BURROUGHS.

O. F. BRYANT.

H. C. READ.

## SERGEANTS.

C. L. PERKINS.

G. B. HEFLER.

C. H. SWAN.

S. T. HOYT.

L. H. BURNS.

D. W. ANDERSON.

W. W. BURROUGHS.

E. D. FRENCH.

H. W. NEAL.

B. W. PROUD.

H. T. CONVERSE.

G. H. CHAMBERLIN.

## CORPORALS.

J. H. BACHELDER.

P. J. BURBECK.

R. E. CARPENTER.

L. E. PIERCE.

C. F. WHITTEMORE.

F. G. FISHER.

B. F. PROUD.

L. W. BENNETT.

E. E. STARK.

J. W. DAVIS.

C. W. KEMP.

W. H. QUIMBY.

## MUSICIANS.

H. W. TENNEY.

W. D. KIDDER.

D. BOYNTON.

## BAND.

1ST LT. J. P. TRICKEY.

SERGEANT C. S. RICHARDSON.

SERGEANT O. D. GOODWIN.

CORPORAL C. W. KELLEY.

SERGEANT P. F. ELLSWORTH.

CORPORAL S. N. WENTWORTH.

SERGEANT J. E. PARKER.

CORPORAL W. MORRILL.

## STUDENTS.

*a*—Agricultural Course; *c*—Course in Technical Chemistry; *g*—General Course; *m e*—Mechanical Engineering; *e e*—Electrical Engineering; *u*—Unclassified. Freshmen in the Engineering Courses are designated by *e* only.

## GRADUATE.

Name.	Residence.
Hayes, Warren Chauncey	Durham.

## SENIORS.

Name.	Residence.
Ackerman, Lawrence Day <i>c</i>	Bristol.
Brown, Edna Olive <i>g</i>	Rye Beach.
Campbell, William Smith <i>e e</i>	Litchfield.
Doe, Marion <i>g</i>	Durham.
Ellsworth, Perry Foss <i>e e</i>	Meredith.
Falconer, John Ironside <i>a</i>	Milford.
Fellows, Ernest Roslyn <i>e e</i>	Exeter.
Goodwin, Otis Dana <i>e e</i>	Hollis.
Kelley, Charles William <i>m e</i>	Barnstead.
Kennedy, Carl Duncan <i>c</i>	Concord.
Lougee, Bernard Ayers <i>e e</i>	Pittsfield.
McKone, Frank E. <i>e e</i>	Dover.
Merrill, Maurice David <i>e e</i>	Andover.
Parker, John Edward <i>a</i>	Goffstown.
Peaslee, Albert <i>m e</i>	Gonic.
Pike, Herbert Samuel <i>m e</i>	Lisbon.
Pratt, Lester Albert <i>c</i>	Alton Bay.
Quimby, Harold Wallace <i>m e</i>	Northwood Narrows.
Richardson, Charles Sidney <i>m e</i>	Cornish Center.
Sargent, George Jackman <i>c</i>	Concord.
Smalley, Lee Lawrence <i>m e</i>	Walpole.
Stevens, Ernest Morton <i>m e</i>	Andover.
Stokes, Iva Dorothy <i>g</i>	Epsom.
Townsend, Harry Storrs <i>a</i>	Lebanon.
Wendell, Chester Snell <i>e e</i>	Dover.
Wilder, Howard Erwin <i>m e</i>	Amesbury, Mass.
Wilkins, Harold Hartshorn <i>m e</i>	Amherst.
Woods, Arthur Page <i>m e</i>	Bath.

## JUNIORS.

Name.	Residence.
Anderson, David Wadsworth <i>a</i>	<i>Manchester.</i>
Batchelder, Henry Edward <i>m e</i>	<i>Exeter.</i>
Bills, Frank Hartwell <i>e e</i>	<i>Reed's Ferry.</i>
Blake, Alfred Edward <i>c</i>	<i>Nashua.</i>
Boynton, Dalton <i>e e</i>	<i>Little Boar's Head.</i>
Bryant, Orville Frank <i>c</i>	<i>Ashland.</i>
Burroughs, Edgar Herbert <i>m e</i>	<i>Sanbornville.</i>
Burroughs, Wilbur Warren <i>m e</i>	<i>Sanbornville.</i>
Chamberlin, George H. <i>e e</i>	<i>Woodsville.</i>
Chase, Fred Odell <i>m e</i>	<i>Warner.</i>
Converse, Henry <i>a</i>	<i>Amherst.</i>
Corliss, Harry Percival <i>c</i>	<i>Wolfeboro.</i>
Corson, Harry Peach <i>c</i>	<i>Laconia.</i>
Drew, Lucy Abby <i>g</i>	<i>Colebrook.</i>
Emery, Roland Chester <i>e e</i>	<i>Hampton.</i>
French, Edward Daniel <i>e e</i>	<i>So. Hampton.</i>
Hefler, George Burpee, <i>m e</i>	<i>Jackson.</i>
Hoyt, Simes Thurston <i>m e</i>	<i>Newington.</i>
Langelier, Wilfred F. <i>c</i>	<i>Nashua.</i>
Lawrence, Cheney E. <i>m e</i>	<i>Nashua.</i>
Leonard, James Mortimer <i>e e</i>	<i>Woodsville.</i>
Morrison, Leonard S. <i>g</i>	<i>Penacook.</i>
Neal, Haldimand W. <i>e e</i>	<i>Dover.</i>
Neal, Robert A. <i>e e</i>	<i>Dover.</i>
Peel, Charles Edward <i>c</i>	<i>Nashua.</i>
Perkins, Clement Linwood <i>c</i>	<i>Berwick, Me.</i>
Read, Harold Clifford <i>e e</i>	<i>Westport.</i>
Sanborn, Edson Dana <i>a</i>	<i>Fremont.</i>
Scammon, Raymond Brewster <i>m e</i>	<i>Stratham.</i>
Thorp, Theron A. <i>e e</i>	<i>Exeter.</i>
Trickey, John Paul <i>c</i>	<i>Rochester.</i>
Wells, Burleigh Ray <i>e e</i>	<i>Somersworth.</i>
Wood, Chester Loring <i>u</i>	<i>Dudley, Mass.</i>

## SOPHOMORES.

Name.	Residence.
Abbott, Harold Vincent <i>m e</i>	<i>Derry.</i>
Arozian, Ohannes A. <i>c</i>	<i>Nashua.</i>
Batchelder, John Hutchins <i>a</i>	<i>Concord.</i>
Bennett, Leland Wilson <i>e e</i>	<i>Laconia.</i>
Brackett, Thomas James <i>a</i>	<i>Greenland.</i>
Brown, Albert H. <i>a</i>	<i>Strafford.</i>
Brown, Charles O. <i>c</i>	<i>Concord.</i>
Burbeck, Perry James <i>e e</i>	<i>Haverhill.</i>
Burns, Lucian H. <i>a</i>	<i>Milford.</i>
Carpenter, Roy Elbert <i>e e</i>	<i>Medford, Mass.</i>
Chase, Carl <i>g</i>	<i>Webster.</i>
Clark, Maurice C. <i>m e</i>	<i>Marlboro.</i>
Colby, Arthur S. <i>a</i>	<i>Tilton.</i>
Cotton, Arthur Clyde <i>g</i>	<i>Alton.</i>
Davis, John Worthen <i>m e</i>	<i>Concord.</i>

Name.	Residence.
DeMerritt, Margaret <i>g</i>	<i>Durham.</i>
Drew, Mariette Alice <i>g</i>	<i>Colebrook.</i>
Easterbrook, Ralph Lewis <i>a</i>	<i>Dudley, Mass.</i>
Fisher, Frank Gordon <i>a</i>	<i>Woburn, Mass.</i>
Gaddas, Sumner Felt <i>e e</i>	<i>Hillsboro.</i>
Gove, Willis Ansel <i>m e</i>	<i>Laconia.</i>
Hammond, Roland Bowman <i>g</i>	<i>Nashua.</i>
Hardy, Harold Elwin <i>a</i>	<i>Hollis.</i>
Hatch, Olive Estelle <i>g</i>	<i>Dover.</i>
Holmes, Harry Wesley <i>e e</i>	<i>Northwood.</i>
Jennings, Earle B. <i>e e</i>	<i>Winchester.</i>
Judkins, Henry Forrest <i>a</i>	<i>Kingston.</i>
Kemp, Charles W. <i>a</i>	<i>Kingston.</i>
Kennedy, Frank Paul <i>g</i>	<i>Dover.</i>
Kidder, Walter Dennis <i>e e</i>	<i>Manchester.</i>
Little, Webb <i>g</i>	<i>Compton.</i>
McLucas, Charles Abraham <i>m e</i>	<i>Nashua.</i>
Morrill, Frank Whitcomb <i>g</i>	<i>Walpole.</i>
Morrill, Winfred <i>m e</i>	<i>Pike.</i>
Nason, Carl Eastman <i>e e</i>	<i>Concord.</i>
Parker, Edward Gookin <i>c</i>	<i>Portsmouth.</i>
Parker, William Folger <i>e e</i>	<i>Goffstown.</i>
Pease, Bret <i>e e</i>	<i>Ashland.</i>
Philbrook, Henry Brown <i>g</i>	<i>No. Hampton.</i>
Pierce, Leonard Emerson <i>e e</i>	<i>Worcester, Mass.</i>
Proud, Benjamin Franklin <i>m e</i>	<i>Manchester.</i>
Proud, Brenton W. <i>e e</i>	<i>Manchester.</i>
Quimby, Waldo Hutchinson <i>e</i>	<i>Concord.</i>
Reynolds, Clearton Howard <i>c</i>	<i>Middletown, N. Y.</i>
Roberts, George Filmore <i>a</i>	<i>Alton.</i>
Robinson, Charles Harrison <i>c</i>	<i>Marlboro.</i>
Scott, Bessie Amanda <i>g</i>	<i>Tyson, Vt.</i>
Stark, Eldon Eugene <i>e e</i>	<i>Haverhill.</i>
Swan, Clyde Henry <i>g</i>	<i>Keene.</i>
Tenney, Harry William <i>e e</i>	<i>Newport.</i>
Towne, Ernest George <i>m e</i>	<i>Thornton.</i>
Tucker, James William <i>g</i>	<i>Concord.</i>
Wentworth, Stephen Neal <i>g</i>	<i>Rochester.</i>
Whittemore, Charles F. <i>c</i>	<i>Pembroke.</i>
Wilkins, Aaron Wallace <i>m e</i>	<i>Amherst.</i>
Wilkins, Carroll Blaisdell <i>g</i>	<i>Nashua.</i>
Wright, Charles Shannon <i>a</i>	<i>Portsmouth.</i>
Wyman, Horace Chester <i>a</i>	<i>Manchester.</i>

## FRESHMEN.

Name.	Residence.
Bailey, Thomas Craig <i>e</i>	<i>New Boston.</i>
Batchelder Roy Eugene <i>e</i>	<i>Sugar Hill.</i>
Bates, Everett Heath <i>e</i>	<i>Dudley, Mass.</i>
Berry, George Wesley <i>a</i>	<i>Stratham.</i>
Bradford, Maurice P. <i>e</i>	<i>Derry.</i>
Brown, Milward W. <i>e</i>	<i>Hillsboro.</i>

Name.	Residence.
Buckminster, Paul D. <i>e</i>	<i>Haverhill, Mass.</i>
Bunker, Lewis L. H. <i>e</i>	<i>Durham.</i>
Casci, Alfred J. <i>e</i>	<i>Concord.</i>
Catlin, Harwood B. <i>e</i>	<i>Hill.</i>
Chamberlain, Walter E. <i>a</i>	<i>Sugar Hill.</i>
Chase, Earle H. <i>e</i>	<i>Newport.</i>
Chase, William Hosea <i>e</i>	<i>Newport.</i>
Cole, Florence Viola <i>g</i>	<i>Dover.</i>
Davis, Arthur G. <i>a</i>	<i>Peterboro.</i>
Davison, Frank S. <i>a</i>	<i>Durham.</i>
DeMerritt, Stephen <i>e</i>	<i>Durham.</i>
Donnelly, Edith G. <i>g</i>	<i>Dover.</i>
Drake, George Lincoln <i>e</i>	<i>Antrim.</i>
Duncan, Raymond C. <i>e</i>	<i>Alton.</i>
Eastman, Wesley Edward <i>a</i>	<i>E. Andover.</i>
Foster, Leland S. <i>e</i>	<i>Newport.</i>
Garland, John A. <i>a</i>	<i>Hampstead.</i>
Gowen, Philip Lewis <i>e</i>	<i>Stratham.</i>
Harding, Daniel Pearl <i>g</i>	<i>New Durham.</i>
Hargraves, Fred Forest <i>e</i>	<i>Nashua.</i>
Hayes, Bernice M. <i>g</i>	<i>Durham.</i>
Hoben, Frank M. <i>c</i>	<i>Concord.</i>
Holden, H. Chester <i>e</i>	<i>Manchester.</i>
Hood, Leslie Newton <i>e</i>	<i>Nashua.</i>
Hooke, Lyman S. <i>a</i>	<i>Fremont.</i>
Huse, Oscar E. <i>a</i>	<i>Newton Junction.</i>
Johnson, Maurice Lingard <i>g</i>	<i>Nashua.</i>
Knight, Ray H. <i>a</i>	<i>Marlboro.</i>
Leighton, Alan <i>g</i>	<i>Concord.</i>
Leighton, Arthur John <i>e</i>	<i>Laconia.</i>
Lovell, Roscoe Ernest <i>e</i>	<i>Portsmouth.</i>
Lowd, Clarence Mortimer <i>e</i>	<i>Clinton, Mass.</i>
McPheters, George A. <i>e</i>	<i>Portsmouth.</i>
Manter, Jerauld A. <i>e</i>	<i>Manchester.</i>
Merrill, Karl E. <i>e</i>	<i>Hudson.</i>
Morgan, Ralph Clifford <i>e</i>	<i>Concord.</i>
Neal, Cecil Maurice <i>e</i>	<i>Portsmouth.</i>
O'Malley, Michael J. <i>e</i>	<i>Somersworth.</i>
Page, William E. <i>e</i>	<i>Haverhill.</i>
Parker, Harry Stinson <i>e</i>	<i>Goffstown.</i>
Payne, Chauncey W. <i>e</i>	<i>Hill.</i>
Perkins, Harold Wilbur <i>e</i>	<i>Dover.</i>
Perkins, Irving C. <i>e</i>	<i>Kennebunkport, Me.</i>
Pettingill, James B. <i>e</i>	<i>Dover.</i>
Phillips, Paul Milton <i>a</i>	<i>Nashua.</i>
Reynolds, Roland E. <i>e</i>	<i>W. Upton, Mass.</i>
Riley, Martin E. <i>e</i>	<i>Somersworth.</i>
Robinson, John E. <i>e</i>	<i>Pembroke.</i>
Rogers, William Edward <i>e</i>	<i>Medford, Mass.</i>
Sawyer, Arthur H. <i>a</i>	<i>Atkinson.</i>
Sawyer, Howard Symmes <i>e</i>	<i>Woodstock.</i>
Scott, Charles Field <i>g</i>	<i>Durham.</i>

Name.	Residence.
Shapleigh, Edward Eugene <i>e</i>	<i>Kittery, Me.</i>
Shaw, Wyman Robinson <i>a</i>	<i>Strafford.</i>
Skinner, Russell E. <i>a</i>	<i>Colebrook. .</i>
Smart, Guy <i>e</i>	<i>Rochester.</i>
Stevens, Ernest C. <i>a</i>	<i>Buffalo, N. Y.</i>
Sughrue, Timothy G. <i>g</i>	<i>Nashua.</i>
Tappan, Albert D. <i>e</i>	<i>North Woodstock.</i>
Taylor, Alexander <i>a</i>	<i>Bedford.</i>
Thompson, Ruth E. <i>g</i>	<i>Durham.</i>
Towle George Wesley <i>e</i>	<i>Newmarket.</i>
Tucker, Herbert R. <i>g</i>	<i>Concord.</i>
Tucker, Raymond Hodgdon <i>e</i>	<i>Berlin.</i>
Tuttle, Harry Benjamin <i>a</i>	<i>Atkinson.</i>
Waldron, Jeremy R. <i>e</i>	<i>Farmington.</i>
Warner, William Pearl	<i>Plaistow.</i>
Watson, Myles S. <i>a</i>	<i>Durham.</i>
Whittemore, Hollie L. <i>e</i>	<i>Colebrook.</i>
Wood, Arthur G. <i>e</i>	<i>Atkinson.</i>

## TWO YEAR COURSE.

## Second Year.

Name.	Residence.
Colburn, Luther Dodge	<i>New Boston.</i>
Barber, Frank W.	<i>Durham.</i>
Hill, Claudian F.	<i>Wakefield.</i>
Martin, Leslie Chapin	<i>Chicopee, Mass.</i>
Melkonian, James	<i>Alton.</i>
Townsend, Hugh	<i>Lebanon.</i>
Waite, Iru Merrill	<i>Goffstown.</i>
Wheeler, Harry F.	<i>Salem Depot.</i>

## First Year.

Avery, Walter J.	<i>Laconia.</i>
Benner, Andrew W.	<i>Gonic.</i>
Bickford, Channing M.	<i>Rye Beach.</i>
Buffum, Warren Hodgdon	<i>Winchester.</i>
Gilman, Daniel E.	<i>Exeter.</i>
Harvey, Vernon C.	<i>Antrim.</i>
Hill, Ernest C.	<i>Strafford.</i>
Osgood, Wilfred Albro	<i>Windham Depot.</i>
Sanborn, Howard W.	<i>Sanbornton.</i>
Silver, Bertram E. G.	<i>Roxbury, Mass.</i>
Snow, Percy S.	<i>Nashua.</i>
Stevens, Henry L.	<i>Franklin.</i>
Wallis, William E., Jr.	<i>Littleton.</i>
Wheeler, Earle O.	<i>Weirs.</i>
Williams, Everett C.	<i>Worcester, Mass.</i>
Wiswell, Everett	<i>Colebrook.</i>
Woods, Minot W.	<i>Bath.</i>



## SPECIAL COURSE.

Name.	Residence.
Abbott, Walter Sidney	<i>Manchester.</i>
Thomas, Edna	<i>Thomaston, Conn.</i>

## TEN WEEK COURSE.

Brown, Perley William	<i>Chester, Vt.</i>
Cady, Burton Frederic	<i>Medford, Mass.</i>
Crockett, Henry Charles	<i>New London.</i>
Lane, Oliver Martin	<i>Keene.</i>
Rollins, Herbert William	<i>Concord.</i>
Stevens, Henry Lee	<i>Franklin.</i>
Wheeler, William John	<i>Antrim.</i>
Woodbury, F. P.	<i>Newburyport, Mass.</i>

## SUMMARY.

Graduate .....	1
Seniors .....	28
Juniors .....	33
Sophomores .....	58
Freshmen .....	76
Students in Ten Week Course.....	8
Students in Two Year Course.....	25
Special Students .....	2
<hr/>	
Total .....	231

## REGISTER OF GRADUATES

NOTE.—The arrangement is: (a) Name in full. (b) Later degrees taken. (c) Residence at time of entering college. (d) Occupation, etc. (e) Present residence. \*Dead. †Present address unknown. Graduates are earnestly requested to inform the registrar of any changes that should be made in this list.

## DOCTOR OF SCIENCE.

Ned Dearborn, D. Sc., 1901. Asst. Curator of Birds, Field Museum of Natural History. *Chicago, Ill.*

## MASTER OF SCIENCE.

Albert Conradi, M. S., 1902. B. Sc., (Ag.) O. S. U., 1901. Prof. of Zoology and Entomology, Clemson Agricultural College, *Clemson, S. C.*

John L. Randall, M. S., 1906. See class of 1905.

William O. Robinson, M. S., 1906. See class of 1905

Lewis H. Kenney, M. E., 1906. See class of 1899.

John D. Clark, M. S., 1907. See class of 1906.



## BACHELORS OF SCIENCE.

1871.

William Preston Ballard, Concord. Farmer.

*R. F. D., Route 1, Concord.*

Lewis Perkins. Hampton. Retired.

*Hampton.*Charles Henry Sanders, Penacook. Merchant. *Main St., Penacook.*

3—

1872.

Edwin Bartlett, Bath. Farmer. *Spearville. Ford Co., Kansas.*

Frank Alexander White, Bow. Surveyor, Farmer.

*Route 4, Concord.*

1873.

2—

†Frederick Erasmus Eldredge, Kensington,

James Fred Smith. A. B., A. M., Dartmouth, 1885; A. M. Stanford, 1900. Principal of High School.

*43 McCoy Ave., Campbell, Cal.*

Charles Henry Tucker, Plaistow. Woodworker.

*24 Highland St., Amesbury, Mass.*

3—

1874.

Millard Fillmore Hardy, Rev., Nelson. Graduated Theo. Inst., Ct., 1878. Clergyman. *East Jaffrey.*

\*Henry Abbott Sawyer, North Weare.

2—\*1

1875.

Walton Herman Aldrich, M. D., Univ. N. Y. City. 1880; Troy. Physician and Surgeon. *Marlborough.*

†Frank Pierce Curtis. Grocer.

*Fitchburg, Mass.*

Frank Veranus Emerson. Lebanon. Manager Axe Mfg. Plant.

*Masconia Terrace, East Lebanon.*Charles Webster Hardy, M. D., Mo. Med. Coll., 1881; Marlboro. Physician and Surgeon. *201 So. Main St., Ottawa, Kansas.*

Harvey Jewell, Winchester. Fruit Grower and Poultryman.

*R. F. D. 1, Cromwell, Conn.*

\*Charles Ormille Leavitt, Lebanon.

\*John Loney McGregor, D. D. S., Phila. Dental Coll., 1877, M. D. Dartmouth, 1883; Whitefield.

Eliel Peck, Lebanon, Postmaster.

*Kimball, Stearns County, Minn.*

Ira William Ramsey, Walpole.

*Walpole.*Orlando Leslie Seward, Keene. Artist. *287 Church St., Keene.*

Emery Mason Willard, Harrisville. Druggist, 15 Union Street,  
Boston, Mass. *109 Hewlett St., Roslindale, Mass.*

11—\*3

1876.

Herbert Cyril Aldrich, Troy. Insurance and Real Estate.

*329 West 4th St., Los Angeles, Cal.*

†Edmund Lawson Brigham, Jaffrey. Mechanic.

Joseph Warren Butterfield, Westmoreland. Farmer.

*North Montpelier, Vt.*

Arthur French Chamberlain, Westmoreland. Partner and New  
York and Foreign Buyer, of Edson Keith & Co.

*132 Michigan Ave., Chicago, Ill.*

Anson Ballard Cross, Holyoke, Mass. Contractor and Builder  
of Railroads.

*Main St., Wilmington, Vt.*

Warren Webster Kimball, Troy. Merchant. *Troy.*

Daniel Deeth Parker, Fitzwilliam. With Heywood Bros. & Wake-  
field Co. *Box 56, Gardner, Mass.*

7—

1877.

Rollin Kirk Adair, Indian Territory. Retail Groceries.

*Chelsea, Indian Ter.*

\*Homer Brooks, M. D., N. Y. Hom. Med. Coll., 1881, Franconia.

John Washington Carson, Mont Vernon. Farmer and Land Sur-  
veyor. *Francetown.*

\*Charles Otto Chubert, Troy.

\*Charles Albert Edwards, LL. B., Univ. of Iowa, 1880; Keene.

\*William Francis Flint, Richmond.

Clinton Camillus Hall, Westmoreland. Agt. New York Life Ins.  
Co. *East Westmoreland.*

John Goodrich Henry, M. D., Dartmouth, 1880; Chesterfield.  
Physician. *15 Pleasant St., Winchendon, Mass.*

\*Charles Pitkin Hollister, North Montpelier, Vt.

George Mirick Holman, M. D., Fitchburg, Mass., Teacher.

*334 Boylston St., Boston, Mass.*

Charles Appleton Hubbard, Troy. Treasurer United Fruit Com-  
pany. *Board of Trade Building, 131 State St., Boston, Mass.*

Carlos Augustus Wheeler, East Calais, Vt. Bee Keeper and  
Farmer. *Bracken, Comal Co., Texas.*

Everard Whittemore, Fitzwilliam. Insurance and Real Estate.  
*14 River St., Hudson, Mass.*

13—\*5

1878.

†Ezra Eastman Adams, Manchester.

\*Elmer Kilburn, Marlow.

Charles Edward Record, Fitchburg, Mass. Contractor and  
Builder. *73 Green St., Leominster, Mass.*

3—\*1

1879.

Charles Hardy Bailey, M. D., Dartmouth, 1881. Physician.

*89 East Broadway, Gardner, Mass., Station A.*Richard Clinton Chapin, Chicopee, Mass. With American Writing  
Paper Company. *Holyoke, Mass.*

\*Lucius M. Cragin, Lempster.

\*Nathaniel Cutler Holmes, Jaffrey.

Fred Charles Park, Lempster. Traveling Salesman.

*6 Essex St., Concord.*George Henry Wilkins, M. D., N. Y. Hom. Med. Coll., 1883; Am-  
herst. Physician. *324 Walnut St., Newtonville, Mass.*

6—\*2

1880.

Charles Harvey Hood, Derry. Milk Business.

*2 Benton Road, Somerville, Mass.*

1—

1881.

Edwin Thompson Aldrich, Troy. General Insurance Agent.

*Bridgman's Block, Keene.*

Henry Lyman Barnard, Troy. Clerk.

*Troy.*

\*George Jordan Boardman, Lawrence, Mass.

Edwin Franklin Bristol, Harwinton, Conn. Farmer.

*Ascutneyville, Vt.*

Artemas Terald Burleigh, Farmer and Lumber Dealer.

*Franklin.*Frank Dana Ely, Cavendish, Vt. With Vermont Marble Com-  
pany, Electrician. *6 School St., Proctor, Vt.*Sanford Eugene Emery, LL. B., Albany Law School, 1886;  
Proctorsville, Vt. Attorney-at-Law. *Proctorsville, Vt.*Charles Herbert Hazen, Hartford, Vt. Farmer and Market  
Gardener. *Bethlehem.*

Frank P. Marston, Hartford, Vt. Real Estate and Insurance.

*46 Main St., Hudson, Mass.*William Augustus Megrath, M. D., Dartmouth, 1886; Cavendish,  
Vt. Physician. *Loudon.*

Fred Townsend Stanton, Strafford. Farmer.

*R. F. D. No. 1, Rochester.*

Victor Hugo Stickney, M. D., Dartmouth, 1883; Tyson, Vt. Physician and Surgeon.

*Dickinson, N. Dak.*

Samuel Austin Wallace, Ph. G., Boston School of Pharmacy, 1886; West Hartford, Vt. Druggist.

*Crookston, Minn.*

George Herbert Whitcher, Strafford. Director of the New Hampshire Agricultural Experiment Station, February 22, 1888 to November 1, 1894; Professor of Agriculture of the New Hampshire College, June, 1887 to November 1, 1894. District Superintendent of Schools, August 1, 1900.

*Berlin.*

14—\*1

1882.

Harvey Lincoln Boutwell, LL. B., Boston University, 1886; Hopkinton. Attorney-at-Law, 209 Washington Street, Boston, Mass.

*37 Pierce St., Malden, Mass.*

Dana Justin Bugbee, North Pomfret, Vt. Mining in Colorado.

*North Pomfret, Vt.*

\*Robert Fletcher Burleigh, M. D., Dartmouth, 1887; Franklin. La Forrest John Carpenter, Surry. Farmer.

*R. F. D. No. 1, Shirley, Mass.*

Edwin Preston Dewey, Hanover. City Engineer.

*237 Olive Ave., Long Beach, Cal.*

George Andrew Loveland, LL. B., University of New York, 1886, Norwich, Vt. Section Director United States Weather Bureau.

*1130 So. 20th St., Lincoln, Neb.*

†John Wright Mason, Hanover.

Harlan Addison Nichols, M. D., Derry. Physician and Surgeon.

*Care Montezuma Copper Co., Nacozari, Sonora, Mexico.*

\*Frank Elmer Thompson, Stark.

9—\*2

1883.

Elmore Ferdinand Arnold, M. D., University City of New York, 1885; Londonderry, Vt. Physician.

*902 Broadway, New York, N. Y.*

Frank Lander Bigelow, Proctorsville, Vt. Instructor in Mathematics and Sciences, Goddard Seminary, Barre, Vt., 1883-1886. Business.

*Rutland, Vt.*

Frederick Stocks Birtwhistle, Troy. Consulting and Supervising Electrical Engineer.

*51 Tucker Bldg., Raleigh, N. C.*

- Noice D. Bristol, Harwinton, Conn. Photographer.  
*2665 Medary Ave., Columbus, O.*
- Frederick Plummer Comings, Lee. Trustee New Hampshire College, 1893-1903. *Lee.*
- Frank Harry Follansbee, Canaan. Railway Postal Clerk.  
*41 Sharon St., West Medford, Mass.*
- Adams Clark French, M. D., D. O., Franklin Falls. Physician.  
*231 So. Hayne St., Chicago, Ill.*
- James Edgar Gay, Tunbridge, Vt. Woolen Manufacturer.  
*Cavendish, Vt.*
- Elmer Daniel Kelley, Franklin Falls. Farmer and Business.  
*445 Central St., Franklin Falls.*
- Alvah Benjamin Morgan, Canaan. Pharmacist, Stationer and Newsdealer. *Woodstock, Vt.*
- William Lincoln Whittier, Deerfield. Foreman of Machine Shop.  
*121 Rantoul St., Beverly, Mass.*
- Charles Minot Woodward, Hanover. Teacher, Public Schools.  
*1620 College Ave., Fort Worth, Texas.*
- 12—

1884.

- \*Ernest Smith Cummings, Lee.
- Fred Carlos Davis, South Reading, Vt. Lawyer, Civil Engineer and Farmer. *123 South St., Springfield, Vt.*
- Sylvester Miller Foster, Riverhead, N. Y. *Westport, Conn.*
- Herbert Harvey Kimball, M. S., Columbian University, 1900, Hopkinton. Director of Research Work in Solar Radiation, U. S. Weather Bureau. *Washington, D. C.*
- Moses Bisbee Mann, Benton. Inspector of Customs.  
*Custom House, Boston, Mass.*
- George Milton Moore, Plymouth, Vt. In private business.  
*Ludlow, Vt.*
- Ziba Amherst Norris, Lyme. Dealer in Groceries and Provisions, Wholesale and Retail, Dorchester and Cohasset.  
*587-593 Washington St., Dorchester, Mass.*
- Edwin Chapin Thompson, Lee. In charge Local Office.  
*Observation Bldg., LaCrosse, Wis.*
- 8—\*1

1885.

George Ellsworth Adams, Weston, Vt. Merchant.

*Vernal, Utah.*Ruel Seabury Alden, Lyme. Superintendent of College Farm,  
1895-'97. Superintendent Vermont Marble Company's Farms.*Proctor, Vt.*

Walter Eugene Angier, C. E., Dartmouth, 1887; West Swanzey.

Civil Engineer. *Office, 1750 Monadnock Block, Chicago, Ill.*

Edward Alonzo Bailey, West Swanzey. Chair Maker.

*55 Pine St., Keene.*

†Phillips Greenleaf Bickford, Lyme.

Andrew Walter Brill, Riverhead, L. I. Clerk North British and  
Mercantile Fire Insurance Company, 76 Williams Street, New  
York, N. Y.*Hempstead, N. Y.*

†Paul Cuff Brooks, Boston, Mass.

Frank Jay Emerson, Epping. Civil Service, U. S. Govt.

*Box 312, Portsmouth.*

Allen Hazen, Wilder, Vt. Consulting Engineer.

*103 Park Ave., Cor. 41 St., New York, N. Y.*

George Mayo Mullins, Londonderry. Attorney-at-Law.

*727 Symes Bldg., 16th and Champa St., Denver, Colo.*Albert Henry Wood, Lebanon. Associate Professor of Agricul-  
ture, 1890-'94. Grain Merchant.*Framingham, Mass.*

11—

1886.

Frank Albert Davis, M. B., M. D., Boston University School of  
Medicine, 1897, 1898; South Lee. Physician.*Hotel Buckminster, Commonwealth Ave. and Beacon Sts.  
Boston, Mass.*

James Ellsworth Harvey, Surry. Photographer.

*51 North Main St., Concord.*Belezar Stoianoff Ruevsky, Tirnovo, Bulgarie. Maître au Gym-  
nase de garçon du Government, Tirnovo, Bulgaria.*Termoro, Bulgaria.*Madison Templeton Thurber, M. D., Dartmouth, 1890, Webster.  
Physician.*85 Savin Hill Ave., Boston, Mass.*

Edward Hills Wason, New Boston. Attorney-at-Law.

*142 Main St., Nashua.*George Pillsbury Wood, Lebanon. Draftsman in charge, Bureau  
of Yards and Docks, Navy Department.*3407 Holmead Place, N. W., Washington D. C.*

6—



1887.

William Sprague Currier, Norwich, Vt. Local Forecaster U. S. Weather Bureau. *1631 Nicholas Bldg., Toledo, Ohio.*

Arthur Woodbury Hardy, C. E., Dartmouth, 1889; Hopkinton. Manager Western Sprinkler Risk Association.

*240 La Salle St., Chicago, Ill.*

George Albert Sanborn, Rochester. Salesman.

*34 Pine St., Rochester.*

Hiram Newton Savage, C. E., Dartmouth; White River Junction, Vt. Member Am. Soc. C. E.; Supervising and Consulting Engineer, U. S. Reclamation Service. *Huntley, Montana.*

Bion Leland Waldron, Strafford. Official in charge U. S. Weather Bureau. *Government Bldg., Hannibal, Mo.*

5—

1888.

\*Melvin Burnside Carr, North Haverhill.

Herbert Grant Davis, South Lee. General Manager Sea View Railroad Company and Narragansett Pier Electric Light & Power Company. *Narragansett Pier, R. I.*

Edwin Chandler Gerrish, Webster. Assistant Paymaster and Long Distance Farmer. *66 Broadway, Lowell, Mass.*

†William Nelson Hazen, C. E., Dartmouth, 1890. Chief Draftsman for the Structural Iron and Steel Co., Bush Street and B. & O. R. R. *Pittsburg, Penn.*

Edward David O'Gara, Hanover. Farmer. *Hanover.*

George Elmer Porter, M. D., Dartmouth, 1892; Hartford, Vt. Physician and Chemist. *Warehouse Pt., Conn.*

George Jonathan Sargent, Canterbury. Civil Engineer and Contractor. *Canterbury.*

John Warren Smith, M. S., 1900; Grafton. Section Director U. S. Weather Bureau. *16 East Broad St., Columbus, Ohio.*

George Elwin Walker, Littleton. Farmer. *Littleton.*

8—\*1

1889.

Fred Harvey Colby, Hopkinton. Fruit Grower. *Prosser, Wash.*

†Linwood Carroll Gillis.

\*Louis Jerome Hutchinson, Norwich, Vt.

John Lawrence Norris, Lyme. Norris Brothers, Groceries and Provisions, 1673-1679 Washington Street, Boston; 529-535 Dudley Street, Roxbury; and 587-593 Washington Street, Dorchester, Mass. President of the Dairy Association Com-



pany, Lydonville, Vt.; Secretary and Treasurer of Photo  
Fabric Company of America. *6 Worcester Sq., Boston, Mass.*  
Charles Walter Earl Scott, Winchester. Mechanic.

*Darrington, Wash.*  
David Elmer Stone, Hartford, Vt. Grain Merchant.

*Framingham Center, Mass.*  
Fred Washburne, West Springfield. With Sargent & Co., Fore-  
man of Foundry Department.

*56 Carmel St., New Haven, Conn.*  
7—\*1

1890.

John Young Jewett, C. E., Dartmouth, 1895; Gilford. Cement  
Expert, U. S. Reclamation Service.

*Armour Institute, Chicago, Ill.*  
†Joseph Franklin Preston, Hanover. Clerk. *Boston, Mass.*  
Elihu Quinby Sanborn, Webster. Machinist. *Contoocook.*  
Clarence Ira Slack, Norwich, Vt. Cashier.

*51 North Market St., Boston, Mass.*  
4—

1891.

Ernest Gowell Cole, Hampton. Postmaster and Merchant.  
*Hampton.*

Russell Marden Everett, Chester. Patent Lawyer and Solicitor.  
*788 Broad St., Newark, N. J.*

Edward Payson Stone, Canaan Center. Farmer. *Orford.*  
3—

1892.

Percey Lovejoy Barker, C. E., Dartmouth, 1894; Milford. Super-  
visor of Bridges and Buildings, N. Y. C. & H. R. R. R.

*Jersey Shore, Penn.*  
Fred Driggs Fuller, Hanover. Chief Chemist, Pennsylvania De-  
partment of Agriculture. *State Capitol, Harrisburg, Penn.*

Arthur Benezette Hough, Lebanon. Dairy Farmer. *Lebanon.*  
Edward Monroe Stone, C. E., Dartmouth, 1894; Marlborough.  
Architect and Engineer. *49 Pearl St., Hartford, Conn.*

4—

1893.

Wilton Everett Britton, Ph. D., Yale, 1903; Keene. State Ento-  
mologist and Entomologist of the Connecticut Agricultural

- Experiment Station. 296 McKinley Ave., New Haven, Conn.  
 Frank John Bryant, Enfield. Postoffice Clerk. Lebanon.  
 Charles Elbert Hewitt, M. M. E., Cornell, 1895; Hanover. Professor of Electrical Engineering, New Hampshire College. Durham.  
 Charles Lincoln Hubbard, M. E., 1895; Fitzwilliam. Consulting Engineer. 283 Central St., Auburndale, Mass.  
 Orrin Moses James, Northwood. Civil Engineer State Highway Department. Northwood Narrows.  
 Arthur Whitmore Smith, M. Sc., Ph. D., Norwich, Vt. Assistant Professor of Physics, University of Michigan. 1008 Oakland Ave., Ann Arbor, Mich.

6—

1894.

- Bert Sargent Brown, Hanover. Farmer. Hollis.  
 Fred Willis Gunn, Keene. Machinist. 18 Huron St., Providence, R. I.  
 Frederic William Howe, Hollis. Professor of Chemistry, Food and Dietetics, State Normal School, Framingham, Mass., Scientific Director Walker Gordon Laboratory Co., and Director of Food Laboratory, Boston Floating Hospital. 793 Boylston St., Boston, Mass.

3—

1895.

- Frank Stanley Adams, Gilsum. In office Vermont Farm Machine Company. 35 Atkinson St., Bellows Falls, Vt.  
 Frank Clifton Britton, Keene. With the Sullivan Machinery Company of Claremont and Chicago (Cost-accounting Department). 7 Prospect St., Claremont.  
 Henry Elmer Hill, Plainfield, Vt. With the Arizona Lumber Company. Plainfield, Vt.  
 Charles Arthur Trow, Mont Vernon. Chief Engineer in construction of Uba Railroad. 602 Rialto Bldg., San Francisco, Cal.

4—

1896.

- Lewis Harris Kittredge, Keene. President the Peerless Motor Car Company, Overlook Road, East, Cleveland, Ohio.

1—

## 1897.

- Harlan Winfred Barney, Grafton. With Amoskeag Mfg. Co.  
112 Myrtle St., Manchester.
- Carrie Augustus Bartlett, Lee. Teacher. *Route 1, Newmarket.*
- Mary Blaisdell Bartlett, (Mrs. I. A. Colby), Epping.  
*Ellwood City, Penn.*
- Walter French Buck, Manchester. Teacher.  
129 W. Elm St., Brockton, Mass.
- Arthur Willard Colburn, Dracut, Mass. Farmer. *Dracut, Mass.*
- Carrie Lydia Comings, Durham. Teacher, Beverly High School.  
28 Abbott St., Beverly, Mass.
- Irving Lyford Dennett. Steam Engineer, Corn Products Refining  
Company. *Hudson Heights, N. J.*
- \*Mary Elizabeth Comings (Mrs. I. L. Dennett), Durham.
- Elwin Henry Forristall, M. Sc., 1900, Columbia. Supt. Mass.  
Agricultural Coll. Farm. *Amherst, Mass.*
- Leslie David Hayes, Durham. Instructor of Descriptive Geome-  
try, Sibley College, Cornell University.  
400 Stewart Ave., Ithaca, N. Y.
- John Norton Hunt, Peterborough, *Peterborough.*
- Ellery Dunbar Jenkins, Lee. Chemist, Lowell Fertilizer Com-  
pany. *P. O. Box 105, Lowell, Mass.*
- Woodruff Mason, Stamford, Conn. *Balenville, N. Y.*
- Roscoe Hart Shaw, Milton. Dairy Expert, U. S. Department of  
Agriculture. *University of Missouri, Columbia, Mo.*
- Charles William Vickery, Dover. With Claflin Brothers, Mining  
Engineers. *Nome City, Alaska.*
- Delbert Amos Wheeler, South Ashburnham, Mass. Teacher.  
*Boston, Mass.*
- Everett Sidney Whittemore, Colebrook. Proprietor of North  
Conway Creamery. *North Conway.*

17—\*1

## 1898.

- \*Richard Cole Butterfield, Westmoreland.
- Helen Buzzell, (Mrs. Alexander McRae), Lee. *R. F. D., 5, Dover.*
- Bernice Elisabeth Caverno (Mrs. E. H. Hancock), Durham.  
*Charlestown, Mass.*
- Burton Albert Corbett, Colebrook. Seed Potato Specialist and  
Breeder of Holstein-Friesian Cattle. *Colebrook.*
- Alfred Caverly Durgin, Lee. Farmer and Fruit Grower.  
*R. F. D., Newmarket.*

James Alfred Foord, Walpole. Professor of Farm Administration and Acting Head of the Div. of Agriculture, Massachusetts Agricultural College. *Amherst, Mass.*

John Williams Fullerton, Somersworth. Paymaster with Great Falls Woolen Company. *Somersworth.*

Arthur Given, Durham. Assistant Chemist, U. S. Department of Agriculture, Bureau of Chemistry.

*1110 16th St., N. W., Washington, D. C.*

Edward Henry Hancock, Belmont. With C. H. Hood Co., Milk business. *Charlestown, Mass.*

Mabel Lucy Hayes, Durham. In charge of Commercial Dept. in High School. *5 Spring St., Newburyport, Mass.*

Tomokichi Hirokawa, B. S., Massachusetts Institute of Technology; Iamabari, Japan. Electrical Engineer, Kyoto Electric Light Company. *Kyoto, Japan.*

Harry Clinton Mathes, Newmarket. Inspector Penn., N. Y. & L. I. R. R. Co. *195 10th St., Long Island City, N. Y.*

Herbert Fisher Moore, M. E., Cornell, 1899; M. M. E., Cornell, 1903; Penacook. Assistant Professor of Theoretical and Applied Mechanics, University of Illinois. Member American Society of Testing Materials.

*Laboratory of Applied Mechanics, Champaign—Urbana, Ill.*

Gerry Austin Morgan, Goffstown. Draftsman with Cox Multi-Mailer Company. *93 Blackstone St., Woonsocket, R. I.*

Harry Putnam Richardson, Milford. With Southern Pacific R. R. *560 10th St., Oakland, Cal.*

Fred Dexter Sanborn, Ashland. Paper Box Manufacturer. Publisher of Weekly Newspaper and Mgr. Job Printing Plant.

*Ashland.*

Fred Webster Smith, Franklin Falls. Representative of Geo. D. Mayo Machine Co. *Sixth and Arch Sts., Laconia.*

Benjamin D. Tolles, Somersworth. With Great Falls Manufacturing Company, Department of Carding. *Berwick, Maine.*

18—\*1

1899.

Henry Clark Baker, South Yarmouth, Mass. Electrical Engineer, Care Crocker-Wheeler. *Ampere, N. J.*

Harry Everett Barnard, Nashua. State Chemist, State House, Indianapolis, Ind.

Harrison Edward Clement, Nashua. Member American Institute Mining Engineers, Mining Engineer. Member of firm Clement & Strange, Engineers and Contractors.

*312 Dooley Block, Salt Lake City, Utah.*

Irving Atwell Colby, Exeter. Designer with Shelby Steel Tube Co. *Box 66, Ellwood City, Penn.*

Willis Daniel Farley Hayden, Hollis. Farm Manager. *Stark Ave., Dover.*

Frederick Libbey Horton, Dover. Engineering Department General Electric Company.

*35 Lovers' Leap Avenue, Lynn, Mass.*  
William Elmer Hunt, Nashua. Captain Twenty-Second United States Infantry. Professor of Military Science and Tactics, New Hampshire College. *Durham.*

Lewis Hobart Kenney, M. E., Pownal, Me. Draftsman-in-charge, Dept. of Steam Engineering, U. S. Navy Yard. *U. S. Navy Yard, Phila. Penn.*

Grace Agnes Mark (Mrs. Herbert F. Moore), Gilsum. *710 West Hill St., Champaign, Ill.*

Arthur Zebulon Norcross, Rindge. Farmer. *Pomfret, Conn.*

Harry Nelson Putney, Franklin. Machinist B. & M. R. R. Shops. *Concord.*

Etta Lillian Simpson, Durham. Principal Dartmouth High School. *Dartmouth, Mass.*

12—

1900.

Herbert Prescott Andrews, Hollis. Engineer, Century Electric Co. *40½ North 4th St., St. Louis, Mo.*

David Burns Bartlett, J. B. and J. M., Boston University Law School, 1907; Manchester. Lawyer.

*53 State St., Boston, Mass.*  
Frances Burnham (Mrs. Robert McA. Keown), Durham.

*206 No. Brooks St., Madison, Wis.*  
Blanche Mary Foye, Durham. Teacher, French and German.

*Concord, Mass.*  
Charles Elliott Page Mathes. Manager Contract Dept., L. R. Ry. & Elect. Co. *Little Rock, Ark.*

Edward Emil Nelson, Nashua. Member of American Institute of Mining Engineers. With American Smelting and Refining Co. *62 E St., Salt Lake City, Utah.*

Alvena Pettee (Mrs. Edward E. Nelson), Bachelor's Diploma in Domestic Science, Teachers' College, Columbia University, 1903; Durham. *62 E St., Salt Lake City, Utah.*

Marie Livingstone Robertson (Mrs. Benjamin M. Duggar), Buffalo, N. Y. *Ithaca, N. Y.*

Walter Noah Shipley, Nashua. Steam Turbine Department, Gen-

eral Electric Company, *138 Lakeview Ave., Lynn, Mass.*  
 Charles Edwin Stillings, Somersworth. Power House Operator.

With Interborough Rapid Transit Co., New York City.

*74th St. and East River, New York, N. Y.*

John Ernest Wilson, Hollis. Electrical Contractor.

*217 1-2 West 1st St., Los Angeles Cal.*

Robert Morrill Wright, Hill. Dealer in Flour, Feed, Grain and Hay.

*Hill.*

12—

1901.

Henry Harold Calderwood, Nashua. Turbine Assembly Department with General Electric Co.

*428 Central St., Saugus, Mass.*

Charles Henry Courser, Warner. Chief Engineer, Wheelwright Paper Mills, Hardwick, Leominster and Fitchburg.

*Leominster, Mass.*

Alice Emerson Dorr, (Mrs. Lewis Cilley); Dover.

*11 Summer St., Dover.*

Harry Willis Evans, Portsmouth. Testing Engineer, Commonwealth-Edison Company.

*550 La Salle Ave., Chicago, Ill.*

Harry Gilbert Farwell, Keene. Engineering Department, General Electric Company.

*403 Summer St., Lynn, Mass.*

Ella Gertrude Gowen, Dover. Giving Lessons in Cookery.

*15 Lexington St., Dover.*

Charles Almon Hunt, Nashua. First Lieutenant, Seventh U. S. Infantry.

*Fort Brady, Sault Ste. Marie, Mich.*

Edwin Price Jewett, Lakeport. In charge of Prescription Department Walker Gordon Laboratory Co.

*2112 Michigan Ave., Chicago, Ill.*

Robert McArdle Keown, Pomona, Fla. Asst. Professor in Machine Design, University of Wisconsin.

*206 No. Brooks St., Madison, Wis.*

Elmer Eugene Lyon, Wentworth. Teacher History and Civil Government, Rugby Academy.

*4803 St. Charles Ave., New Orleans, La.*

George J. Penneo, Hampstead. Farmer.

*Hampstead.*

Harold Morrison Runlett, Durham. Wholesale Shoe Business.

With Clark Hutchinson Co., 121 Duane St., New York, N. Y.

Edson Albert Straw. With the A. K. Co., Box Dept.

*Ashland.*

13—



1902.

Mary Doe, (Mrs. Charles H. Ayres), Rollinsford.

*21 W. 31st St., New York, N. Y.*

Edwin W. Gilmartin, Nashua.

*9 Middle St., Nashua.*

John C. Kendall, Peterboro. State Dairy Commissioner.

*Manhattan, Kans.*

Harry M. Lee, Moultonborough. Foreman Buena Vista Farm.

*Windsor, Vt.*

Abiel A. Livermore, Wilton, Rose Grower.

*290 Salem St., Wakefield, Mass.*

George E. Merrill, B. Ag., Cornell University, 1903; Newburyport, Mass. Special Field Agent, Bureau of Entomology, U. S. Dept. of Agriculture.

*Washington, D. C.*Charles A. Payne, Portsmouth. Technical Asst. Heating—Engineering Dept., G. E. Co. *320 McClellan St., Schenectady, N. Y.*

Eugene P. Runlett, Durham. With Williams &amp; Clark Shoe Manufacturers, Lynn, Mass.

Arthur L. Sullivan, Suncook. Chemist, Bureau of Chemistry U. S. Dept. of Agriculture.

*1461 Chapin Street, N. W., Washington, D. C.*

9—

1903.

Harry David Batchelder, West Upton, Mass. Chief Chemist, Carnegie Steel Co., Sharon Coke Works, South Sharon, Penn.

*Box 491, Sharon, Penn.*

Edgar Forest Bickford, Rochester. Asst. Electrical Engineer, B. &amp; N. St. Ry. Co. &amp; O. C. St. Ry. Co.

*84 State St., Boston, Mass.*

Frank Ray Brown, Durham. Instructor in Shopwork, New Hampshire College.

*Durham.*

Everett William Burbeck, Haverhill. Mining &amp; Civil Engineer with Oliver Iron Mining Co.

*Box 370, Eveleth, Minn.*

Everett Garfield Davis, Newmarket. Provision Dealer.

*Kingston.*Albert Noah Otis, Durham. With Ford, Bacon & Davis, Consulting Engineers and Contractors. *24 Broad St., New York, N. Y.**806 Gay St., Knoxville, Tenn.*

Ralph Harvey Rollins, East Concord. Engineer U. S. Reclamation Service.

*Yuma, Ariz.*Morris Archer Stewart, Dover. Chemist. *121 Belknap St., Dover.*

David Albert Watson, Durham. Farming.

*R. F. D. No. 1, Durham.*



Melvin Johnson White, M. A., Univ. of Wisconsin, 1907; Farmington. Instructor of American History and Civics in High School.

*208 No. Brooks St., Madison. Wis.*

10—

1904.

Leander Ashton, Pittsfield. Carnation Grower.

*High Street, Framingham Center, Mass.*

Walter Allen Barker, Pittsfield. Civil Engineer with Stone & Webster Engineering Corporation.

*15 Exchange St., Boston. Mass.*

Edgar Charles Bickford, Durham. Electrical Assistant at B. E. Ry. E. E. Office.

*552 Harrison Ave., Boston. Mass.*

Percy Anderson Campbell, Litchfield. Professor of Animal Industry, University of Maine.

*Orono, Maine.*

Carroll Winfred Farr, North Weare. Dairy Farmer and Breeder of Ayrshire Cattle.

*North Weare.*

Joseph Ezra Goodrich, New Durham. Master of Ridge School.

*Chapin Cottage, Washington, Conn.*

George Herbert Hill, La Crosse, Wis. Draughtsman at Office of Supt. of Shops, Chicago, Burlington & Quincy R. R.

*C. B. & Q., Aurora, Ill.*

Thomas Jefferson Laton, Nashua. Instructor in Mechanical Drawing, New Hampshire College.

*Box 155, Durham.*

Raymond Louis Lunt, Dover. Telephone Engineer, Western Electric Co.

*463 West St., New York, N. Y.*

Arthur Ronello Merrill, North Bridgton, Me. Dairy Farmer.

*Norfolk St., Holliston, Mass.*

Samuel Ambrose Richardson, Charlestown. Foreman for G. M. Gest, Conduit Contractor.

*277 Broadway, New York, N. Y.*

11—

1905.

John Henry Chesley, Rockingham. Turbine Testing Department, General Electric Company.

*77 Mall St., West Lynn, Mass.*

Cleon Orestes Dodge, Sunapee. Chemist, Bureau of Chemistry.

*Bureau of Chemistry, Washington. D. C.*

Silas Bryden Hayden, South Natick, Mass. Engineer.

*Box 958 Gary, Ind.*

Harry Linwood Hayes, Exeter. Testing Dept., General Electric Company.

*Schenectady, N. Y.*

Warren Chauncey Hayes, Durham. Graduate Student, New Hampshire College.

*Durham.*

Fred Harvey Heath, Warner. Student in Graduate School of Yale University and Asst. in Qualitative Analysis in Kent Laboratory.

*P. O. Box 712, Yale Station, New Haven, Conn.*

\*Harold Nims Knight, Marlborough.

Joseph Wesley Moreton, Medford, Mass. Electrical Engineer, Niagara, Lockport and Ontario Power Co.

*Y. M. C. A. Bldg., Buffalo, N. Y.*

Orlo Dudley Mudgett, Gilmanton. Sales Department, Westinghouse Electric & Manufacturing Company.

*716 Board of Trade Bldg., Boston, Mass.*

Horace James Pettee, Durham. Structural Draftsman, Illinois Steel Co.

*550 La Salle Ave., Chicago, Ill.*

Arthur Mahlon Pike, Dover. Construction Foreman, General Electric Co.

*Schenectady, N. Y.*

Fred Silver Putney, M. S., Penn. State College, 1908, Hopkinton. Scholar at Univ. of Missouri, 1908-'09.

*Columbia, Mo.*

John Leslie Randall, M. S., Lee. Teacher, State Normal School.

*California, Penn.*

William Orrin Robinson, M. S., Marlborough. Physical Chemist, Bureau of Soils, Dept. of Agriculture.

*Bur. of Soils, Washington, D. C.*

\*Harry Union Russell, West Derry.

Elmer Seth Savage, Lancaster. Instructor in Animal Husbandry, Cornell University.

*606 No. Aurora St., Ithaca, N. Y.*

Castine Caroline Swanson, Cambridge, Mass.

*10 Hollis St., Cambridge, Mass.*

Frank Alvin Tinkham, Grafton. Farming.

*Grafton.*

18—\*2

1906.

Samuel Taylor Adams, Pittsfield.

*Durham.*

Stuart Kendrick Barnes, Walpole. Chief Chemist, Retort Coke Oven Co.

*Cleveland, Ohio.*

Charles S. Batchelder, South Hampton. Market Gardening.

*Waban, Newton Centre, Mass.*

Willis Cassius Campbell, West Windham.

*4651 Drexel Boulevard, Chicago, Ill.*

John Dustin Clark, Nashua. Associate Professor of Chemistry, Univ. of New Mexico.

*Albuquerque, N. Mex.*

Clarence Elbert Clement, Derry. Dairyman.

*Cherry Hill Farm, Beverly, Mass.*

Ernest Luther Converse, Amherst. Instructor in Sciences, Virginia Institute.

*Bristol, Va.*

Neil Starr Franklin, Bernardston, Mass. With Westinghouse Electric and Manufacturing Co.

*1105 South Ave., Wilkensburg, Penn.*

Carl Tilson Fuller, Nashua. Chemical Engineer, General Electric Co. Lamp Works. *Harrison, N. J.*

William Safford Gooch, Exeter. Engineering Department, New England Tel. & Tel. Co. *164 High St., Boston, Mass.*

Ralph Edward Gowen, Stratham. Running Power House for Carbon Coal Co. *Carbon, W. Va.*

Edwin Davis Hardy, Nashua. Testing Steam Turbines.

*E. Pittsburg, Penn.*

Cyrus Fremont Jenness, Gonic. Market Gardening.

*Waban, Newton Centre, Mass.*

Allen Montague Johnson, Nashua. *9 Locust St., Nashua.*

Wallace Fuller Purington, South Yarmouth, Mass. Assistant Chemist, New Hampshire State Board of Health, Laboratory of Hygiene, Concord. *Concord.*

Edwin Jay Roberts, Laconia. Graduate Student, Assistant in Kent Chemical Laboratory.

*Box 712, Yale Station, New Haven, Conn.*

Roy Vance Swain, Barrington, With Autocar Company.

*45 Wyoming Ave., Ardmore, Penn.*

Charles Leo Tuttle, Exeter. Engineering Department, New England Tel. and Tel. Co. *164 High St., Boston, Mass.*

18—

# 1907.

Leon Dexter Batchelder, West Upton, Mass. Asst. Florist, Dept. of Horticulture, Cornell University. *Ithaca, N. Y.*

Philip Ray Berry, Alton. *Alton.*

Andrew Brogini, Concord. Turbine Testing Dept., General Electric Company. *77 Mall, West Lynn, Mass.*

Harold Hurst Dickey, Manchester. Dept. Manager John A. Whalley Company. *209 Coleman Bldg., Seattle, Wash.*

Carl Austin Dodge, New Boston. Asst. Chemist, Wellsbach Light Company. *Gloucester City, N. J.*

Harry Edward Ingham, Nashua. Instructor in Shopwork, New Hampshire College. *Box 155, Durham.*

Frank Davis Lane, Manchester. Instructor.

*79 Walnut St., Manchester.*

Ralph Albion Littlefield, Portsmouth. Dairy Farming.

*N. Reading, Mass.*

Bernard C. Noyes, Lisbon. Massachusetts State Forest Service. *Room 7, State House, Boston, Mass.*

John Glenn Powers, Concord. Instructor in the Abbott School.  
*Farmington, Maine.*

Frank Wiggin Randall, Portsmouth. *Portsmouth.*

Ellice Storrs Townsend, (Mrs. C. D. Hazen, Jr.), Lebanon.  
*White River, Vt.*

Lucia Soule Watson, Durham. Teacher in Enfield High School.  
*Wells St., Enfield.*

Arthur Jason Woodward, Lancaster. Testing Dept. General Electric Company.  
*303 Lenox Road, Schenectady, N. Y.*

14—

1908.

Waldo Lawrence Adams, Townsend, Mass. *Durham.*

Arthur Hosea Barton, Newport. *Durham.*

Arthur Milliken Batchelder, Suncook. *Suncook.*

Minot Giles Buss, Wilton. Teacher Berlin High School. *Berlin.*

Lawrence Andrew Carlisle, Exeter. *18 Oak St., Exeter.*

James Dennis Cash, Massabesic. Teacher. *Manchester.*

Mary Abbie Chesley, Durham. Teacher. *Thetford, Vt.*

Francis Clough, Contoocook. General Electric Company.  
*Lynn, Mass.*

Charles Francis Cone, Nashua. *4 Myrtle St., Nashua.*

Merton Maine Cory, Nashua. *12 Park St., Nashua.*

John Timothy Croghan, Concord. *Concord.*

Katharine DeMeritt, Durham. Teacher.  
*12½ W. Broad St., Westerly, R. I.*

Walter Woods Evans, East Kingston. Graduate Student at University of Toronto. *Chemical Dept., University of Toronto.*

Oren Lovell Farwell, Chesham. *Chesham.*

Harry Fifield French, Plymouth. Asst. Chemist, State Lab. of Hygiene, Concord. *16 South St., Concord.*

Stanley Fiske Hill, Nashua. *Nashua.*

Merritt Chase Huse, Concord. *11 No. Spring St., Concord.*

William R. Kirkpatrick, Nashua. Gypsy Moth Inspector, U. S. Govt. *Box 77, Nashua.*

John Joseph O'Connor, Portsmouth. *3 Porter St., Portsmouth.*

John Caleb Page, Dover. *Sixth St., Dover.*

George Arthur Perley, Goffstown. Graduate Student at Cornell University. *715 State St., Ithaca, N. Y.*

Sarah Elizabeth Pettee, Durham. Student at Teachers' College, Columbia University. *1230 Amsterdam Ave., New York, N. Y.*

James Henry Priest, Manchester. *711 Beech St., Manchester.*

Moses Herman Sanborn, Fremont. *Fremont.*

Dean Fred Smalley, Walpole. Private Business. *Walpole.*

- Carl Brown Tarbell, Milton. Surveying. *No. Rochester.*  
 Ray Emery Wadleigh, Kensington. Illuminating Engineer,  
 Southern Electric Company. *Baltimore, Md.*  
 George Lyman Waite, Dunbarton. *Concord, Route 2.*  
 Harold Duncan Walker, Kittery, Me. *Kittery, Me.*  
 Francis Ward Woodman, W. Derry. Graduate Student and Fel-  
 low at University of Missouri. *417 Witt St., Columbia, Mo.*

30—

## TWO YEAR COURSE IN AGRICULTURE.

- Lyman Charles Stratton, Hollis, 1897. Superintendent Dairy  
 Farm. *St. George, Ga.*  
 Charles Wesley Martin, Durham, 1898. Clerk and Assistant with  
 Sacramento Gas, Electric & Railway Company.  
*3219 Magnolia Ave., Oak Park, Sacramento, Cal.*  
 George Henry Wheeler, Temple, 1898. Farmer. *Temple.*  
 Fred Joseph Durell, Newmarket, 1900. Farmer. *Newmarket.*  
 Harry Alvin Elliott, Lyme, 1900. Blacksmith. *Lyme.*  
 Edward Augustus Hills, Hollis, 1900. Farmer. *Hollis.*  
 Albert Cate Knowles, Epsom, 1900. Farmer and Seed Agent.  
 With Dunlap & Sons, Nashua. *Epsom.*  
 †Robert Hale Pearson, Webster, 1900.  
 Charles Nicklin Blodgett, Hebron, 1901. Manager Breezy Point  
 Farm, Breezy Point. *Warren.*  
 Harry Douglass Verder, Hollis, 1901. Stock Raiser. *Hollis.*  
 Rufus Leonard Cushman, North Adams, Mass. 1901. Gardener.  
*No. Auburn, Mass.*  
 †George R. Brew, Lowell, Mass., 1902.  
 Carroll W. Farr, North Weare, 1902. B. S. New Hampshire Col-  
 lege, 1904.  
 George F. Hills, Hollis, 1902. Farmer. *Hollis.*  
 Walter E. Quimby, Deerfield, 1902. Farm Superintendent.  
*Center Belmont, Maine.*  
 Walter P. Tenney, Chester, 1902. Homedale Farm. *Chester.*  
 †Thornton N. Weeks, Greenland, 1902.  
 Robert E. Whittier, Deerfield, 1902. Supt. Maplewood Farm,  
 Danvers, Mass.  
 Edward C. Wilson, Wilton, 1902. Live Stock Commission, Union  
 Stock Yards, care of Wood Bros.  
*6022 Princeton Ave., Chicago, Ill.*  
 Harry Garfield Brierley, Dover, 1903. Farmer. *Stratham.*  
 †George Grover Manning, Boston, Mass., 1903.  
 James Henry Nixon, East Brentwood, 1903. Superintendent Red  
 Hill Farm. *R. F. D. 1, Centre Harbor.*



- Roscoe Franklin Swain**, South Hampton, 1903. Dairy Farmer.  
*Amesbury, Mass.*
- Erland Graves Batchelder**, Wilton, 1904. Dairy Farmer, Poultryman and Fruit Grower. *Wilton.*
- Wesley Pillsbury Flint**, Newburyport, Mass., 1904. Field Assistant in Entomology, Office State Entomologist. *Urbana, Ill.*
- Henry Marston Shurbert**, Northwood Ridge, 1904. Gardener for Mrs. W. E. Barrett. *West Newton, Mass.*
- Arthur G. Dunn**, Harrisville, 1905. Manager of Mine Brook Farm. *R. F. D., Medfield, Mass.*
- Henry N. Gowing**, Dublin, 1905. Poultryman and Fruit Grower. *Dublin.*
- Alfred Walter Clough**, 1906. Farmer. *Greenland.*
- Oliver Carter Dimond**, West Concord, 1906. Farmer.  
*R. F. D. No. 12, West Concord.*
- Ralph Wayne Forristall**, Alstead, 1906. Farmer. *Alstead.*
- Stanley Hargreaves**, 1906. Assistant, Forest Park, Springfield, Mass.
- Robert S. Sawyer**, 1906. Farmer. *Walpole.*
- David Raymond Batchelder**, Wilton, 1907. Dairyman.  
*Cherry Hill Farm, Beverly, Mass.*
- Alfred Elwin Blood**, East Sullivan, 1907. Farmer.  
*East Sullivan.*
- Abram Lawrence Dean**, Taunton, Mass., 1907. *Madbury.*
- Simes Frink**, Newington, 1907. Farmer. *Newington.*
- William Patrick Hickey**, Bow, 1907. Timekeeper, Carnegie Steel Company. *Newark, N. J.*
- Frederick Henry Charles Kampe**, East Alstead, 1907. Agriculturist. *East Alstead.*
- Lee Augustus Parker**, Keene, 1907. Gardener.  
*195 Eastern Ave., Keene.*
- Lewis Elwell Sanborn**, Ashland, 1907. Dairyman.  
*380 Plainfield St., Springfield, Mass.*
- Ernest Eugene Tucker**, Durham, 1907. Head Gardener Private Estate. *Dublin.*
- Charles Shannon Wright**, Portsmouth, 1907. Student New Hampshire College. *Durham.*
- George A. Holmes**, Langdon, 1908. *Langdon.*
- Guy Leavitt**, Sanbornton, 1908. *Sanbornton.*
- Harold Thom Littlefield**, Salem Depot, 1908. *Salem Depot.*

## SUMMARY.

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Manufacturers and Mechanics.....	27
Physicians .....	14
Teachers .....	43
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United States Army .....	2
United States Weather Bureau.....	6
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## ALPHABETICAL LIST OF GRADUATES.

- Adams, E. E., 1878.  
 Adams, G. E., 1885.  
 Adams, F. S., 1895.  
 Adams, L. A., 1908.  
 Adams, S. T., 1906.  
 Adair, R. K., 1877.  
 Alden, R. S., 1885.  
 Aldrich, H. C., 1876.  
 Aldrich, W. H., 1875.  
 Aldrich, T. E., 1881.  
 Andrews, H. P., 1900.  
 Angier, W. E., 1885.  
 Arnold, E. F., 1883.  
 Ashton, L., 1904.  
 Bailey, C. H., 1879.  
 Bailey, E. A., 1885.  
 Baker, H. C., 1899.  
 Ballard, W. P., 1871.  
 Barker, P. L., 1892.  
 Barker, W. A., 1904.  
 Barnard, H. E., 1899.  
 Barnard, H. L., 1881.  
 Barnes, S. K., 1906.  
 Barney, H. W., 1897.  
 Bartlett, Miss C. A., 1897.  
 Bartlett, D. B., 1900.  
 Bartlett, E., 1872.  
 Bartlett, Miss M. B., 1897.  
 Barton, A. H., 1908.  
 Batchelder, D. R. (2 year), 1907.  
 Batchelder, A. M., 1908.  
 Batchelder, C. S., 1906.  
 Batchelder, E. G. (2 year), 1904.  
 Batchelor, H. D., 1903.  
 Batchelor, L. D., 1907.  
 Berry, P. R., 1907.  
 Bickford, E. C., 1904.  
 Bickford, E. F., 1903.  
 Bickford, P. G., 1885.  
 Bigelow, F. L., 1883.  
 Birtwhistle, F. S., 1883.  
 Blodgett, C. N. (2 year), 1901.  
 Blood, A. E. (2 year), 1907.  
 \*Boardman, G. J., 1881.  
 Boutwell, H. L., 1882.  
 Brew, G. R. (2 year), 1902.  
 Brierley, H. G. (2 year), 1903.  
 Brigham, E. L., 1876.  
 Brill, A. W., 1885.  
 Bristol, E. F., 1881.  
 Bristol, N. D., 1883.  
 Britton, F. C., 1895.  
 Britton, W. E., 1893.  
 Broggin, A., 1907.  
 \*Brooks, H., 1877.  
 Brooks, P. C., 1885.  
 Brown, B. S., 1894.  
 Brown, F. R., 1903.  
 Bryant, F. J., 1893.  
 Buck, W. F., 1897.  
 Bugbee, D. J., 1882.  
 Burbeck, E. W., 1903.  
 Burleigh, A. T., 1881.  
 \*Burleigh, R. F., 1882.  
 Burnham, Miss F., 1900.  
 Buss, M. G., 1908.  
 Butterfield, J. W., 1876.  
 \*Butterfield, R. C., 1898.  
 Buzzell, Miss H., 1898.  
 Calderwood, H. H., 1901.  
 Campbell, P. A., 1904.  
 Campbell, W. C., 1906.  
 Carlisle, L. A., 1908.  
 Carpenter, L. J., 1882.  
 \*Carr, M. B., 1888.  
 Carson, J. W., 1877.  
 Cash, J. D., 1908.  
 Caverno, Miss B. E., 1898.  
 Chamberlin, A. F., 1876.  
 Chapin, R. C., 1879.

- Chesley, J. H., 1905.  
 Chesley, Miss M. A., 1908.  
 \*Chubert, C. O., 1877.  
 Clark, J. D., 1906.  
 Clement, C. E., 1906.  
 Clement, H. E., 1899.  
 Clough, A. W. (2 year), 1906.  
 Clough, F., 1908.  
 Colby, F. H., 1889.  
 Colby, I. A., 1899.  
 Colburn, A. W., 1897.  
 Cole, E. G., 1891.  
 Comings, Miss C. L., 1897.  
 Comings, F. P., 1883.  
 \*Comings, Miss M. E., 1897.  
 Cone, C. F., 1908.  
 Conradi, Albert; M. S., 1902.  
 Converse, E. L., 1906.  
 Corbett, B. A., 1898.  
 Cory, M. M., 1908.  
 Courser, C. H., 1900.  
 Cragin, L. M., 1879.  
 Croghan, J. T., 1908.  
 Cross, A. B., 1876.  
 \*Cummings, E. S., 1884.  
 Currier, W. S., 1887.  
 Curtis, F. P., 1875.  
 Cushman, R. L. (2 year), 1901.  
 Davis, E. G., 1903.  
 Davis, F. A., 1886.  
 Davis, F. C., 1884.  
 Davis, H. G., 1888.  
 Dean, A. L. (2 year), 1907.  
 Dearborn, N.; D. Sci., 1901.  
 DeMerritt, Miss K., 1908.  
 Dennett, I. L., 1897.  
 Dewey, E. P., 1882.  
 Dimond, O. C., (2 year), 1906.  
 Dickey, H. H., 1907.  
 Dodge, C. A., 1907.  
 Dodge, C. O., 1905.  
 Doe, Miss M., 1902.  
 Dorr, Miss A. E., 1901.  
 Dunn, A. G. (2 year), 1905.  
 Durell, F. J. (2 year), 1900.  
 Durgin, A. C., 1898.  
 \*Edwards, C. A., 1877.  
 Eldredge, F. E., 1873.  
 Elliott, H. A. (2 year), 1900.  
 Ely, F. D., 1881.  
 Emerson, F. J., 1885.  
 Emerson, F. V., 1875.  
 Emery, S. E., 1881.  
 Evans, H. W., 1901.  
 Evans, W. W., 1908.  
 Everett, R. M., 1901.  
 Farr, C. W., 1904; (2 year), 1902.  
 Farwell, H. G., 1901.  
 Farwell, O. L., 1908.  
 \*Flint, W. F., 1877.  
 Flint, W. P. (2 year), 1904.  
 Everett, R. M., 1891.  
 Follansbee, F. H., 1883.  
 Foord, J. A., 1898.  
 Forristall, E. H., 1897.  
 Forristall, R. W. (2 year), 1906.  
 Foster, S. M., 1884.  
 Foye, Miss B. M., 1900.  
 Franklin, N. S., 1906.  
 French, A. C., 1883.  
 French, H. F., 1908.  
 Frink, S. (2 year), 1907.  
 Fuller, C. T., 1906.  
 Fuller, F. D., 1892.  
 Fullerton, J. W., 1898.  
 Gay, J. E., 1883.  
 Gerrish, E. C., 1888.  
 Gillis, L. C., 1889.  
 Gilmartin, E. W., 1902.  
 Given, A., 1898.  
 Gooch, W. S., 1906.  
 Goodrich, J. E., 1904.  
 Gowen, Miss E. G., 1901.  
 Gowen, R. E., 1906.

- Gowing, H. N. (2 year), 1905. Huse, M. C., 1908.  
 Gunn, F. W., 1894. \*Hutchinson, L. J., 1889.  
 Hall, C. C., 1877. Ingham, H. E., 1907.  
 Hancock, E. H., 1898. James, O. M., 1893.  
 Hardy, A. W., 1887. Jenkins, E. D., 1897.  
 Hardy, C. W., 1875. Jenness, C. F., 1906.  
 Hardy, E. D., 1906. Jewell, H., 1875.  
 Hardy, M. F., 1874. Jewett, J. Y., 1890.  
 Hargreaves, S. (2 year), 1906. Jewett, E. P., 1901.  
 Harvey, J. E., 1886. Johnson, A. M., 1906.  
 Hayden, S. B., 1905. Kampe, F. H. C. (2 year), 1907.  
 Hayden, W. D. F., 1899. Kelley, E. D., 1883.  
 Hayes, H. L., 1905. Kendall, J. C., 1902.  
 Hayes, L. D., 1897. Kenney, L. H.; M. E., 1906.  
 Hayes, Miss M. L., 1898. Keown, R. McA., 1901.  
 Hayes, W. C., 1905. \*Kilburn, E., 1878.  
 Hazen, A., 1885. Kimball, H. H., 1884.  
 Hazen, C. H., 1881. Kimball, W. W., 1876.  
 Hazen, W. N., 1888. Kirkpatrick, W. R., 1908.  
 Heath, F. H., 1905. Kittredge, L. H., 1896.  
 Henry, J. G., 1877. \*Knight, H. N., 1905.  
 Hewitt, C. E., 1893. Knowles, A. C. (2 year), 1900.  
 Hickey, W. P. (2 year), 1907. Lane, F. D., 1907.  
 Hill, G. H., 1904. Laton, T. J., 1904.  
 Hill, H. E., 1894. \*Leavitt, C. O., 1875.  
 Hill, S. F., 1908. Lee, H. M., 1902.  
 Hills, E. A. (2 year), 1900. Littlefield, H. T. (2 year), 1908.  
 Hills, G. F. (2 year), 1902. Littlefield, R. A., 1907.  
 Hirakawa, T., 1898. Livermore, A. A., 1902.  
 \*Hollister, C. P., 1877. Loveland, G. A., 1882.  
 Holman, G. M., 1877. Lunt, R. L., 1904.  
 Holmes, G. A. (2 year), 1908. Lyon, E. E., 1901.  
 \*Holmes, N. C., 1879. \*McGregor, J. L., 1875.  
 Hood, C. H., 1880. Mann, M. B., 1884.  
 Horton, F. L., 1899. Manning, G. G. (2 year), 1903.  
 Hough, A. B., 1892. Mark, Miss G. A., 1899.  
 Howe, F. W., 1894. Marston, F. P., 1881.  
 Hubbard, C. A., 1877. Mason, J. W., 1882.  
 Hubbard, C. L., 1893. Mason, W., 1897.  
 Hunt, C. A., 1901. Martin, C. W. (2 year), 1898.  
 Hunt, J. N., 1897. Mathes, C. E. P., 1900.  
 Hunt, W. E., 1899. Mathes, H. C., 1898.

- Megrath, W. A., 1881.  
 Merrill, A. R., 1904.  
 Merrill, G. E., 1902.  
 Moore, G. M., 1884.  
 Moore, H. F., 1898.  
 Moreton, J. W., 1905.  
 Morgan, A. B., 1883.  
 Morgan, G. A., 1898.  
 Mudgett, O. D., 1905.  
 Mullins, G. M., 1885.  
 Nelson, E. E., 1900.  
 Nichols, H. A., 188z.  
 Nixon, J. H., ( 2 year), 1903.  
 Norcross, A. Z., 1899.  
 Norris, J. L., 1889.  
 Norris, Z. A., 1884.  
 Noyes, B. C., 1907.  
 O'Connor, J. J., 1908.  
 O'Gara, E. D., 1888.  
 Otis, A. N., 1903.  
 Page, J. C., 1908.  
 Parker, D. D., 1876.  
 Parker, F. C., 1879.  
 Parker, L. A., (2 year), 1907.  
 Payne, C. A., 1902.  
 Pearson, R. H. (2 year), 1900.  
 Peck, E., 1875.  
 Penneo, G. J., 1901.  
 Perkins, L., 1871.  
 Perley, G. A., 1908.  
 Pettee, Miss S., 1908.  
 Pettee, H. J., 1905.  
 Pettee, Miss A., 1900.  
 Pike, A. M., 1905.  
 Porter, G. E., 1888.  
 Powers, J. G., 1907.  
 Preston, J. F., 1890.  
 Priest, J. H., 1908.  
 Purrington, W. F., 1906.  
 Putney, F. S., 1905.  
 Putney, H. N., 1899.  
 Quimby, W. E. (2 year), 1902.  
 Ramsey, I. W., 1875.  
 Randall, F. W., 1907.  
 Randall, J. L.; M. S., 1906.  
 Record, C. E., 1878.  
 Richardson, H. P., 1898.  
 Richardson, S. A., 1904.  
 Roberts, E. J., 1906.  
 Robertson, Miss M. L., 1900.  
 Robinson, W. O.; M. S., 1906.  
 Rollins, R. H., 1903.  
 Ruevsky, B. S., 1886.  
 Runlett, E. P., 1902.  
 Runlett, H. M., 1901.  
 \*Russell, H. U., 1905.  
 Sanborn, E. Q., 1890.  
 Sanborn, F. D., 1898.  
 Sanborn, G. A., 1887.  
 Sanborn, L. E. (2 year), 1907.  
 Sanborn, M. H., 1908.  
 Sanders, C. H., 1871.  
 Sargent, G. J., 1888.  
 Savage, E. S., 1905.  
 Savage, H. N., 1887.  
 \*Sawyer, H. A., 1874.  
 Sawyer, R. S. (2 year), 1906.  
 Scott, C. W. E., 1889.  
 Seward, O. L., 1875.  
 Shaw, R. H., 1897.  
 Shipley, W. N., 1900.  
 Shurbert, H. M. (2 year), 1904.  
 Simpson, Miss E. L., 1899.  
 Slack, C. I., 1890.  
 Smalley, D. F., 1908.  
 Smith, A. W., 1893.  
 Smith, F. W., 1898.  
 Smith, J. F., 1873.  
 Smith, J. W., 1888.  
 Stanton, F. T., 1881.  
 Stewart, M. A., 1903.  
 Stickney, V. H., 1881.  
 Stillings, C. E., 1900.  
 Stone, D. E., 1889.

- |                                 |                                 |
|---------------------------------|---------------------------------|
| Stone, E. M., 1892.             | Wallace, S. A., 1881.           |
| Stone, E. P., 1891.             | Washburn, F., 1889.             |
| Stratton, L. C. (2 year), 1897. | Wason, E. H., 1886.             |
| Straw, A. E., 1901.             | Watson, D. A., 1903.            |
| Sullivan, A. L., 1902.          | Watson, Miss L. S., 1907.       |
| Swain, R. F. (2 year), 1903.    | Weeks, T. N. (2 year), 1902.    |
| Swain, R. V., 1906.             | Wheeler, C. A., 1877.           |
| Swanson, Miss C. C., 1905.      | Wheeler, D. A., 1897.           |
| Tarbell, C. B., 1908.           | Wheeler, G. H. (2 year), 1898.  |
| Tenney, W. P. (2 year), 1902.   | Whitcher, G. H., 1881.          |
| Thompson, E. C., 1884.          | White, F. A., 1872.             |
| *Thompson, F. E., 1882.         | White, M. J., 1903.             |
| Thurber, M. F., 1886.           | Whittemore, E., 1877.           |
| Tinkham, F. A., 1905.           | Whittemore, E. S., 1897.        |
| Tolles, B. D., 1898.            | Whittier, R. E. (2 year), 1902. |
| Townsend, Miss E. S., 1907.     | Whittier, W. L., 1883.          |
| Trow, C. A., 1895.              | Wilkins, G. H., 1879.           |
| Tucker, C. H., 1873.            | Willard, E. M., 1875.           |
| Tucker, E. E. (2 year), 1907.   | Wilson, E. C. (2 year), 1902.   |
| Tuttle, C. L., 1906.            | Wilson, J. E., 1900.            |
| Verder, H. D. (2 year), 1901.   | Wood, A. H., 1885.              |
| Vickery, C. W., 1897.           | Wood, G. P., 1886.              |
| Wadleigh, R. E., 1902.          | Woodman, F. W., 1908.           |
| Waite, G. L., 1908.             | Woodward, A. J., 1907.          |
| Waldron, B. L., 1887.           | Woodward, C. M., 1883.          |
| Walker, G. E., 1888.            | Wright, C. S. (2 year), 1907.   |
| Walker, H. D., 1908.            | Wright, R. M., 1900.            |

\*Dead

## SPECIMEN ENTRANCE EXAMINATION PAPERS FOR FOUR YEAR COURSES.

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### ENGLISH.

The purpose of this examination is to test (1) the candidate's knowledge and appreciation of certain specified works, and (2) his ability to write correctly. As bearing on the latter point, he is advised to go over his paper carefully before the end of the time allowed, correcting any inaccuracies, not neglecting capitals and punctuation.

I. (1) Give and illustrate the rules for the comma.

(2) Discuss the use of quotation marks.

II. Arrange in chronological order and name the authors of the following works: Silas Marner, Macbeth, The Sir Roger de Coverly Papers, The Passing of Arthur, Life of Goldsmith, Ivanhoe and The Ancient Mariner.

III. Write not less than 200 words upon two of the following topics:

The Phantom Ship and its Passengers.

The Moral Degeneration of Macbeth.

Sir Roger de Coverly at the Theatre.

Caesar's Behavior on the Day of his Death.

The Plot of Silas Marner.

IV. Discuss fully and carefully four of the following topics: The topic sentence and its development.

The respective advantages of the long sentence, the periodic sentence, the balanced sentence.

Unity in the paragraph.

Coherence in the composition.

Emphasis in the sentence.

V. Quote at least ten lines from Milton.

### AMERICAN HISTORY.

1. Give an account of the principal discoveries, explorations and settlements, made previous to 1607, within the present mainland limits of the United States, by (a) The Northmen, (b-c) The Spanish, (d) The French, (e) The English.

2. Give an account of the American share in the following:— (a) King William's War, (b) Queen Anne's War, (c) King George's War, (d-e) The French and Indian War.

3. Give a brief account of (a) the Stamp Act, (b) the boundaries of the United States according to the Treaty of 1783, (c-d) the nature and history of the Articles of Confederation,



(e) Financial condition of the United States under the Articles of Confederation.

4. Explain the following questions which have been connected with issues since 1865:—(a-b) The conflict over reconstruction, (c) The race problem, (d) The silver coinage struggle, (e) The Venezuelan affair, 1895.

5. Select two subjects from the following and write at least fifty words upon each:—(a) Early education in America; (b) The virtues and limitations of Quakers and Puritans; (c) Patriotism and lack of patriotism during the Revolution; (d) Clay's character and services; (e) The Know-Nothing Party.

6. Give the substance of the last three amendments to the Constitution.

#### ANCIENT HISTORY.

1. Islands about Greece:—(a) Three important islands or groups in the Aegean; (b) The important island near the eastern coast; (c) Some important island near the western coast; (d-e) The historically important island midway between Greece and Egypt. The important traditions and early history of that island.

2. (a) History and influence of the Delphian oracle. (b) Three classes of people in Sparta. (c-d) Government of Sparta. (e) Myth of Lycurgus.

3. The Persian Invasion:—(a) Brief account of principal expedition sent by Darius; (b-c) Brief accounts of the four important battles resulting from the invasion of Xerxes; (d-c) Outline of collateral reading on the Persian Invasion.

4. Outlines of life and public services:—(a) Pericles; (b) Alcibiades; (c) Socrates; (d) Xenophon; (e) Epaminondas.

5. (a) The causes in Rome leading to the establishment of the tribunate; (b-c) The history and character of the laws of the twelve tables. (d) the war with the Greeks (Pyrrhus). (e) Roman road making.

6. (a-c) Brief outlines of the three wars between Rome and Carthage. (d) The Roman provincial system. (e) Brief accounts of Marius and Sulla.

7. Some account of five books used for collateral reading in Ancient History.

#### ENGLISH HISTORY.

1. (a-c) Outline map showing the situation of England, the form of the coast, five important rivers, and five important places.

(d) The early Germans: home, customs, institutions.



- (e) The English conquest; purpose and manner of coming of the English; principal events.
- 2. The Hundred Years' War.
  - (a) Accession of Edward III: character; causes for trouble between England and France; preparations for war.
  - (b-c) Course of war to 1377: important events; Treaty of Bretigny; causes for English success; renewal of war; state of affairs at close of reign.
  - (d-e) Renewal of war by Henry V: causes; condition of France; Agincourt; Treaty of Troyes; Joan of Arc; close of the war.
- 3. England under the Tudors, 1485-1558.
  - (a) The House of Tudor: characteristics; policy.
  - (b) The establishment of despotism: measures of Henry VII; condition of the country; position of Parliament; reasons for acceptance of Tudor despotism.
  - (c) The new learning in England: character of the English movement; leaders; connection with Reformation.
  - (d) The Reformation under Henry VIII.
  - (e) The Catholic Reaction under Mary.
- 4. Wars of Empire, 1689-1815.
  - (a) Battle of the Boyne. (b) King William's War. (c) Queen Anne's War. (d) King George's War. (e) Strife for the Ohio Valley.
- 5. War of the French Revolution. (a) The French Revolution. (b-c) War to Peace of Amiens. (d-e) Trafalgar. Waterloo.

#### MEDIAEVAL AND MODERN HISTORY.

- 1. Give an outline of the history of Kingdom of the Ostrogoths.
- 2. Explain the meaning of each of the following words: Janizaries, reliefs, escheats, aids, villeins.
- 3. What were the characteristics which distinguished the early Teutons.
- 4. Give an account of the Third Crusade.
- 5. In one hundred words give the history of Spain from A. D. 700 to A. D. 1500.
- 6. Give the history of the Russo-Turkish War of 1877-78.
- 7-8. Write a sketch of each of the following:—Wallenstein, Richelieu, Colbert, Garibaldi.
- 9. Locate each of the following and describe some historical event connected with the place:—Narva, Versailles, Trafalgar, Sadowa.
- 10. Draw a map showing the political divisions in the south-east of Europe.

## ENTRANCE ALGEBRA.

1. State the general laws for exponents in multiplication and division.

2. Perform the indicated operations and simplify

$$(a+b+c+d)^2 - (a-b-c-d)^2$$

3. Divide

$$8x^{m+4} - 18x^{m+3} - 13x^{m+2} + 9x^{m+1} + 2x^m \text{ by } 4x^m + x^{m-1} - 2x^{m-2}$$

4. A father is four times as old as his son, but in 24 years the father will be only twice as old as the son. What is the present age of each.

5. Write the factors of

$$14a^4b + 21a^3b^2 - 35a^2b^3 - 42ab^4$$

$$15c^2 + 22cx + 8x^2$$

$$x^5 - y^5$$

6. (a) Change to an equivalent fraction having the lowest com-

mon denominator  $\frac{1}{x+1} + \frac{1}{(x+1)^2} + \frac{1}{(x+1)^3}$

(b) Simplify  $\frac{m-5x}{m+5x} + \frac{10mx}{m^2-25x^2}$

7. Solve for x  $\frac{1}{x+1} + \frac{1}{x+2} = \frac{1}{x} + 3$

8. Solve for x  $\begin{cases} 3x^2 - 8x - 16 = 0 \\ a+x = x-2a \\ a-x = x+2a \end{cases}$

9. Expand by the binomial theorem  $(2x+4b)^4$

10. (a) Simplify  $\frac{c}{x} \sqrt{\frac{x^4}{c^3}} , \frac{2}{m^2} \sqrt[3]{\frac{54m^4}{x}}$

(b) Multiply  $\sqrt{-5x} ; \sqrt[3]{-8ax^3} ; \sqrt[4]{81abx^7}$

(c) Multiply  $-\sqrt{2c} ; -3\sqrt{-2a} ; +2\sqrt{-3b} ; +a\sqrt{3c} ; -2\sqrt{bc}$

## PLANE GEOMETRY.

1. Prove that if two oblique lines drawn from a point in a perpendicular cut off equal distances from the foot of the perpendicular, they are equal.

2. Prove that if two parallel lines are cut by a third line the alternate interior angles are equal.

3. The exterior angle at base of an isosceles triangle equals 125 degrees, what are the angles of the triangle?

4. Prove that the three bisectors of the angles of a triangle meet at a point.

5. Prove that the diagonal of a parallelogram divides the

figure into two equal triangles.

6. Prove that the sum of the interior angles of any polygon is equal to two right angles, taken as many times less two as the figure has sides.

7. In equal circles two angles at the centre have the same ratio as their intercepted arcs when the arcs are incommensurable.

8. The arc intercepted by a tangent to a circle and a diameter is 75 degrees, what is the angle between the tangent and the produced diameter?

9. Construct a mean proportional to two given lines.

10. Prove if a straight line divides two sides of a triangle proportionally, it is parallel to the third side.

#### SOLID GEOMETRY.

1. If a line is perpendicular to each of two lines at their point of intersection, it is perpendicular to the plane of the two lines.

2. If a line is perpendicular to a plane, any plane passing through the line is perpendicular to the plane.

3. The sum of the face angles of a convex polyedral angle is less than four right angles.

4. A plane passed through the diagonally opposite edges of a parallelopiped divides it into two equivalent triangular prisms.

5. A triangular prism may be divided into three equivalent triangular pyramids.

6. The lateral surface of the frustum of a regular pyramid is equal to one-half of the product of the slant height by the sum of the perimeters of the bases.

7. The surface of a sphere is equal to the area of four great circles.

8. The measure of a spherical angle is the arc of a great circle described from its vertex as a pole, included between its sides produced if necessary.

9. The area of a spherical triangle is equal to the product of the spherical excess by a tri-rectangular triangle.

10. The angles of a spherical triangle are the supplements of the sides opposite in the polar triangle.

## PLANE TRIGONOMETRY.

1. Define cosine, tangent, secant, anti-tangent, radian.
2. Change  $3/5 \pi$  to degrees;  $38^\circ$  to radians.
3. Determine sine, cosine and tangent of  $30^\circ$ ; of  $45^\circ$ .
4. Prove  $\sin 2x = 2 \sin x \cos x$ .
5. Prove  $\sin 2x = \frac{2 \tan x}{1 + \tan^2 x}$ .
6. The sign of an angle is  $2/7$ . Find remaining functions of same angle.
7. In a right angled triangle one angle is  $25^\circ$ . The hypotenuse is 340. Write formula for side opposite the given angle.
8. In an oblique angled triangle, given the three sides; write formulas for area and one angle.
9.  $\sin 2x - \tan x = 0$ . Solve for  $x$ .

## PHYSICS.

1. Tell what you can of the standards of length, mass and time. What is meant by fundamental units? Distinguish between the gram as a unit of mass, and as a unit of force. Define force and the components of a force. How do you account for the variation in the gravitational units of force as we go from one locality to another?

State and illustrate Newton's laws of motion. State the laws of hydrostatics. State Archimedes' principle. Explain the construction of a simple barometer, and outline carefully the principles upon which its theory is based. Explain why high mountain climbing often causes pain and bleeding in the ears and nose. State the Kinetic Theory of Gases. State the simple machines. Explain the siphon.

2. What is the distinction between heat and temperature? State the effects of heat. Illustrate each. Explain what is meant by saturated and unsaturated vapors, and give their laws.

What is meant by "Absolute Zero?" How do you account for the protection of fish life in winter? What provision is made in steel bridges for the changes due to temperature variations? Distinguish heat of fusion and heat of vaporization. State the principles upon which the ventilation of houses depends.

3. Account for the difference in the intensity of shadows formed by opaque bodies. What is meant by diffusion of light? by reflection? by refraction? the critical angle? a continuous spectrum? Draw sketches to show the formation of images produced by concave mirrors and lenses. Explain the simple microscope. Account for the formation of the rainbow.

4. State the sources of sound, and the characteristics of media by which it is transmitted. Distinguish longitudinal and transverse wave motion. State the characteristics of musical sounds. Define each. Define an echo, resonance, a tone, a harmonic, and sympathetic vibrations. Outline the use of the lips, tongue and teeth in the production of the vowels and consonants.

5. Devise an experiment to show that a piece of iron attracts a magnet just as truly as the magnet attracts the iron. What is meant by a magnetic line of force? a field of force? by the declination of a compass needle? Devise an experiment to show conclusively the existence, simultaneously, of two unlike kinds of electrification when it is produced by friction. Explain the electrophorous. State the effects of an electric current. Describe a simple voltaic cell and tell why it may rapidly run down. State a rule for determining the polarity of a magnet made by placing around it a coil of wire carrying a current.

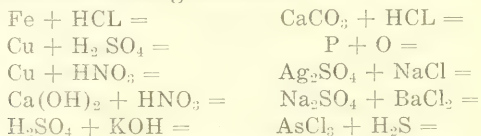
#### CHEMISTRY.

1. Define Synthesis, Efflorescence, a base, polymerism, reduction.

2. Give the occurrence in nature and properties of nitrogen and enumerate some of its commercial compounds.

3. If the valence of an element x is 1 write the simplest formula for its carbonate, nitrate, borate and sulphite.

4. Complete the following reactions :



5. If one liter of Hydrogen is mixed with 1500 c.c. of Oxygen and the mixture exploded what gas and how much remains unacted upon?

6. How many grains of Ammonium Hydroxide is needed to neutralize 294 grains of sulphuric acid?

7. Give the commercial source, method of preparation and uses of  $\text{NH}_3$ .

8. Briefly describe two methods of determining molecular weights.

9. Give the occurrence and properties of zinc and describe the method of preparing the metal from its sulphide.

10. State the Law of Mass Action ; the Law of Dulong & Petit ; the Law of Definite Proportions ; the Periodic Law.

Atomic weight of nitrogen = 19.

“ “ “ sulphur = 32.

**ZOOLOGY.**

1. Define a Protozoan and name two animals which belong to this class.
2. Give the internal structure of an earthworm. How does the earthworm differ from the Coelenterales and Arthropods?
3. Define and describe an insect. How does an insect breathe, and where are its organs of smell and excretion?
4. What is meant by Evolution? How is one species supposed to give rise to another?
5. Define hermaphrodite, hybrid, parasite, mimicry, Aves.
6. Name one animal from each of the following orders,—Mollusca, Arthropoda, Mammalia, Echinodermata and Pisces.

**ELEMENTARY BOTANY.**

1. Define calyx, petal, stamen, ovary, spike, tendril.
2. What is meant of self-pollination? Cross-pollination? Give an example of each. Name three agencies of cross-pollination.
3. Describe an exogenous stem as seen in cross-section. How does it differ from an endogenous stem?
4. Define tuber, bulb, stolon, bract, internode, petiole. Give an example of each.
5. Define respiration. Define photosynthesis. Compare the two as to necessary conditions, products and value to plant.
6. What are the following and what part does each play in the life of the plant: transpiration, stoma, epidermis, chlorophyll, protoplasm?
7. Give the meaning of the following: plumule, cotyledon, radicle, testa, legume.
8. Describe the form, structure and reproduction of a particular cryptogamous or flowerless plant.

**GEOLOGY.**

1. Describe the destructive and constructive work of a glacier. What characters of a land surface indicate the action of glaciers during some past age?
2. How are mountains formed? Diagram.
3. Define—continental shelf, anticline, talus, stratum, delta.
4. How is coal formed? What different kinds are there and how are they formed?
5. How is soil formed? Name all the agencies which aid in soil formation.
6. For what was the Triassic period noted? Describe some of the animals and plants then living.



7. How are coral reefs formed? What is an atoll?
8. Define a fossil. Name several of the more common ones.

## FRENCH.

1. Where have you studied French? How long? What books have you read?
2. Synopsis simple and compound tenses:
  - (1) Third person singular of aller.
  - (3) Second person plural of faire.
3. Conjugate:—
  - (1) Present of recevoir.
  - (2) Future of venir.
  - (3) Conditional of vouloir.
4. Principal parts of italicized verbs in 6, 7 and 8.
5. Translate:—
  - (1) Should I study well, the master would be glad.
  - (2) Durham, September 3, 1907. (Write out date).
  - (3) I have not received any money.
  - (4) When he comes, he will tell me what he has done.
  - (5) You must remain at home today.
  - (6) Although he is poor, he is happy.
  - (7) Have you finished your lessons? I have finished them.
  - (8) How long have you been here?
  - (9) I have been here for three days.
  - (10) Give me some black coffee, if you please.

## 6. Translate:—

Un célèbre médecin avait soigné un petit enfant pendant une maladie dangereuse. La mère reconnaissante arrive chez le sauveur de sons fils. "Docteur, *dit-elle*, il y a des services qui ne se payent pas. Je ne *savais* comment reconnaître vos soins. J'ai pensé que vous *voudriez* bien accepter ce porte-monnaie que j'ai brodé de ma main.—Madame, répliqua un peu rudement le docteur, la médecine n'est pas une affaire de sentiment et nos soins veulent être rémunérés en argent. Les petits cadeaux *entretiennent* l'amitié mais ils n'entretiennent pas nos maisons.—Mais docteur, dit la dame surprise et blessée, parlez, fixez un chiffre.—Madame, c'est deux mille francs." La dame ouvre le porte-monnaie, en tire cinq billets de banque de mille francs, en donne deux au médecin, remet les trois autres dans le porte-monnaie, salue froidement et se retire.

## 7. Translate:—

Enfin, ayant *attendu* jusqu'à près de neuf heures, l'ennemi arrivait à pas accélérés, et les ponts ne *pouvant* plus servir



qu'aux Russes si on différait davantage, il se décida, le coeur navré, et détournant les yeux de cette scène affreuse, à *faire mettre* le feu. Sur-le-champ des torrents de fumée et de flammes enveloppèrent les deux ponts, et les malheureux qui étaient dessus se précipitèrent pour n'être par entraînés dans leur chute. Du sein de la foule qui n'avait point encore passé, un cri de désespoir s'éleva tout à coup: des pleurs, des gestes convulsifs s'apercevaient sur l'autre rive. Des blessés, de pauvres femmes tendaient les bras vers leurs compatriotes qui s'en allaient, forcés malgré eux de les abandonner.

8. Translate:—

Mais leur douleur bruyante produisait moins d'impression que le désespoir meut d'un personnage qui attirait tous les regards. C'était le malheureux père, qui allant d'un cadavre à l'autre, soulevait leurs têtes souillées de terre, baissait leurs lèvres violettes, *soutenait* leurs membres déjà roidis, comme pour leur éviter les cahots de la route. Parfois on le voyait *ouvrir* la bouche pour parler, mais il n'en sortait pas un cri, pas une parole. Toujours les yeux fixés sur les cadavres, il se heurtait contre les pierres, contre les arbres, contre tous les obstacles qu'il recontrait.

### ELEMENTARY GERMAN.

I. Translate.

Frau Biesendahl. Herr Oberlehrer, Sie wissen, dass wir auf eine sehr gute Erziehung halten und dass wir jede Roheit von *unseren Kindern* fernzuhalten suchen. Mein Mann ist Beamter und ich bin die Tochter eines Zollassistenten, da brauch' ich wohl nicht erst zu sagen, dass die Kinder bei uns im Hause niches Schlechtes hören. Herr Flemming erlaubt sich aber Ausdrücke gegen die Kinder, die einfach empörend sind.

II. Translate.

Sie *sprachen* nichts mehr; sie gingen stumm neben einander zum See hinab. Die Luft war schwül, im Westen stieg schwarzes Gewölk auf. "Es wird gewittern," sagte Elisabeth, indem sie ihren Schritt *beeilte*. Reinhardt nickte, und beide gingen rasch am Ufer entlang bis sie ihren Kahn *erreicht* hatten.

Während der Überfahrt *liess* Elisabeth ihre Hand auf dem Rande des Kannes ruhen. Er blickte beim Rudern zu ihr hinüber, sie aber sah an ihm vorbei in die Ferne. So glitt sein Blick herunter und *blieb* auf ihrer Hand; und die blasse Hand *verriet* ihm, was ihr Antlitz ihm *verschwiegen* hatte.

III. Translate.

"Thue das nicht!" sagte die Nachtigall. "Der hat ja Gutes

gethan, so lange er konnte! Behalte ihn nur! Ich aber kann im Schlosse nicht wohnen, lass mich daher kommen, wenn ich selbst Lust habe, da will ich des Abends auf diesem Zweige sitzen und dir etwas vorsingen, damit du froh werden kannst! Ich komme weit herum, zu Armen und Reichen, zu Glücklichen und Unglücklichen und werde dir von vielem singen können, was in deinem Reiche *passiert* und dir *verborgen bleibt*. Aber eins musst du mir versprechen."—"Alles!" sagte der Kaiser und stand da in seiner kaiserlichen Tracht, die er selbst *angelegt* hatte, und drückte den goldenen Säbel an sein Herz.

IV. Translate.

Als einst der Doktor ein neues Prachtwerk mitgebracht hatte und mit Freude wahrnahm, wie Marie mit einer gewissen Ostentation das Gespräch mit *dem Grafen* abbrach, um sich an einem Seitentisch von ihm über die abgebildeten *Antiken* belehren zu lassen, bemerkte der edle Magyar *der Kanzleirätin*, er für seinen Teil hege nicht das mindeste Interesse für den alten Plunder und überlasse dergleichen Sachen den Herren Gelehrten, worauf die Kanzleirätin erwiderte, sie finde das sehr begreiflich; ein Kavalier wie Graf Csanady habe eben eine *andere Sphäre* als die Bourgeoisie.

V. Prin. parts italicized verbs in II and III.

VI. Translate:

1. Yesterday the day was very beautiful.
2. I took a book and went into the garden to study.
3. The fisherman's dog came out of the hut.
4. I gave him bread: it pleased him.
5. Then he fetched the fisherman from the house and we went to the river to fish.
6. These old soldiers will sleep, but the young king will not see them.
7. The old woman has become very angry.
8. I put the clock on the table at half past eight.
9. If he were here he would go to the theatre.
10. He speaks as if he had much money.

VII. Decline italicized words in I and IV.

VIII. Give synopsis 3rd sing. simple and compound tenses of *gehen*.

Decline pres. dürfen: wollen: lehren: geben: versprechen.

LATIN ELEMENTARY.

I. Translate into idiomatic English:—

Flumen est Arar, quod per fines Aeduarum et Sequanorum

in Rhodanum influit, incredibili lenitate, ita ut oculis, in  
 utram partem fluat, iudicari non possit. Id Helvetii ratibus  
 ac lintribus iunctis transibant. Ubi per exploratores Caesar  
 5 certior factus est, tres iam partes copiarum Helvetios id  
 flumen traduxisse, quartam fere partem citra flumen Ararim  
 reliquam esse, de tertia vigilia cum legionibus tribus e castris  
 profectus ad eam partem pervenit, quae nondum flumen  
 transierat. Eos impeditos et inopinantes aggressus magnam  
 10 partem eorum concidit; reliqui sese fugae mandarunt atque  
 in proximas silvas abdiderunt. (Caesar. Gallic War: Book I.)

## II.

Decline *fines* (line 1) *certior* (line 5) *flumen* (line 6)

Syntax of *lenitate* (line 2) *oculis* (line 2) *legionibus* (line 7)

Explain mode of *possit* (line 3) *traduxisse* (line 6)

Compare *proximas* (line 11)

## III. Translate into idiomatic English:—

Qua consuetudine cognita Caesar, ne graviori bello occur-  
 reret, maturius, quam consuerat, ad exercitum proficiscitur.  
 Eo cum venisset, ea, quae fore suspicatus erat, facta cognovit:  
 Missas legationes ab nonnullis civitatibus ad Germanos invi-  
 5 tatōsque eos, uti ab Rheno discederent, omniaque, quae postu-  
 lassent, ab se fore parata. Qua spe adducti Germani latius  
 vagabantur et in fines Eburonum et Condrusorum, qui  
 sunt Treverorum clientes, pervenerant. Principibus Galliae  
 evocatis Caesar ea, quae cognoverat, dissimulanda sibi exis-  
 10 timavit eorumque animis permulsis et confirmatis equitatuque  
 imperato bellum cum Germanis gerere constituit.

IV. Syntax of *Rheno* (line 5) *sibi* (line 9)

Inflect *proficiscitur* (line 2) and *postulassent* (line 5)

Prin. parts of *consuerat*, (line 2) *facta* (line 3) *vagabantur*  
 (line 7)

Decline *equitatu* (line 10) *spe* (line 6)

Derivation of *legationes* (line 4) *civitatibus* (line 4)

## V. Translate into Latin:—

- I. Caesar is about to cross the river in order to attack the enemy.
2. They went from the camp at night.
3. If the Germans should send soldiers to us within two days, we would not proceed against them.
4. Since he knew that the soldiers were ready, he quickly crossed the bridge and advanced into the enemy's territory.

## ADVANCED LATIN.

## I. Translate into idiomatic English:—

- Hic quis potest esse, Quirites, tam aversus a vero, tam praeceps, tam mente captus, qui neget haec omnia, quae videmus, praecipueque hanc urbem deorum immortalium nutu ac potestate administrari? Etenim, cum esset ita res-
- 5 ponsum, caedes, incendia interitum rei publicae, comparari, et ea per cives, quae tum propter magnitudinem scelerum non nullis incredibilia videbantur, ea non modo cogitata a nefariis civibus, verum etiam suscepta esse sensitis. Illud vero nonne ita praesens est, ut nutu Iovis optimi maximi factum esse
- 10 videatur, ut, cum hodierno die mane per forum meo iussu et coniurati et eorum indices in aedem Concordiae ducerentur, eo ipso tempore signum statueretur? Quo collocato atque ad vos senatumque converso omnia quae erant cogitata contra salutem omnium, illustrata et patefacta vidistis. (Cicero.
- 15 Catiline. III.)

Give reason for mode of neget (line 2) esset (line 4.)

Explain derivation of magnitudinem (line 6) collocato (line 12.)

Syntax of nullis (line 7) civibus (line 8.)

## II. Translate into idiomatic English.

- Ut primum cessit furor, et rabida ora quierunt:  
Incipit Aeneas heros: Non ulla laborum,  
O virgo, nova mi facies inopinave surgit:  
Omnia praecepi, atque animo mecum ante peregi.
- 5 Unum oro; quando hic inferni ianua regis  
Dicitur, et tenebrosa palus Acheronte refuso;  
Ire ad conspectum chari genitoris, et ora  
Contingat; doceas iter, et sacra ostia pandas.  
Illum ego per flammam et mille sequentia tela
- 10 Eripui his humeris, medioque ex hoste recepi;  
Ille meum comitatus iter, maria omnia mecum,  
Atque omnes pelagique minas coelique ferebat  
Invalidus, vires ultra sortemque senectae.  
Quin, ut te supplex peterem, et tua limina adirem,
- 15 Idem orans mandata dabat. Natique patrisque,  
Alma, precor, miserere: potes namque omnia; nec te  
Nequicquam lucis Hecate praefecit Avernis.

Scan the following lines, marking principal caesura, etc. Line 1; line 4; line 8.

Explain the form quierunt (line 1) the mode of doceas (line 8.)

Syntax of natiq (line 15) lucis (line 17.)

IV. If any one shall accuse me because I have not arrested so wicked a man rather than let him go from the city, that is not my fault, but the fault of the times. Cataline ought to have been killed long ago, but there are very many who defend him and do not believe what I report. If I had punished him by death, his accomplices would have escaped. What crimes have they not committed these years! Would that you knew their plots! There is no nation whom we fear, but we must now contend with all these desperate men.







Exhibit of the New Hampshire Agricultural Experiment Station at the Rochester Fair, 1908.





NINETEENTH AND TWENTIETH  
ANNUAL REPORTS

OF THE

NEW HAMPSHIRE  
Agricultural Experiment  
Station.

NOVEMBER 1, 1906, TO OCTOBER 31, 1908.

NEW HAMPSHIRE  
AGRICULTURAL EXPERIMENT STATION.

NOV. 1, 1908.

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## THE STATION STAFF.

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FRED W. MORSE, M. S., <i>Vice-Director and Chemist.</i>
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BERT E. CURRY, M. S., <i>Associate Chemist.</i>
JASPER F. EASTMAN, B. S., <i>Assistant Agriculturist.</i>
C. F. JACKSON, M. A., <i>Assistant Entomologist.</i>
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W. C. McNUTT, <i>Herdsman.</i>
NELLIE F. WHITEHEAD, <i>Purchasing Agent.</i>
MABEL H. MEHAFFEY, <i>Stenographer.</i>
LAVINIA BROWN, <i>Assistant Bookkeeper.</i>
ESTHER LOUISE ADAMS, B. S., <i>Librarian.</i>

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## REPORT OF THE DIRECTOR.

*To the President of the New Hampshire College of Agriculture and the Mechanic Arts.*

SIR:—I beg to submit the following report of the work of the Experiment Station for the biennial period November 1, 1906, to November 1, 1908, with fiscal report for the years ending June 30, 1907, and June 30, 1908.

## ADMINISTRATION.

*Changes in Staff.* The position of Horticulturist of the Station, caused by the resignation of Prof. Rane was filled by the appointment of his former assistant, Harry F. Hall, in November, 1906. Prof. Hall resigned to go into commercial work in June, 1908, and his place was filled by the appointment of B. S. Pickett, a graduate of the Ontario Agricultural College and recently assistant in Pomology at the University of Illinois. The vacancy in the Department of Dairy Manufactures was filled by the appointment of Fred Rasmussen, assistant in the Dairy department of the Iowa Agricultural College and Experiment Station, as head of the department in September, 1907. E. L. Shaw, Associate Agriculturist, resigned in June, 1907, to take a position in the Bureau of Animal Industry, U. S. Dept. of Agriculture, and W. H. Pew, a recent graduate of the Iowa Agricultural College, was elected to the vacancy. In June, 1908, the Department of Animal Husbandry was separated from the Department of Agriculture and Mr. Pew was given charge of the new department. Mr. J. K. Shaw resigned June, 1907, and Mr. J. C. Wilcox of the Michigan Agricultural College was appointed to the vacancy in October, but resigned in June, 1908, and the vacancy was filled by the appointment of W. H. Wicks, a graduate of the Oregon Agricultural College and who has since been doing graduate work at Cornell University. Dr. T. J. Headlee, associate entomologist, resigned in August, 1907, to accept the position of Professor of Zoology and Entomology at the Kansas Agricultural College and Experiment Station. Mr. C. S. Spooner was appointed to this position but resigned in June, 1908, and the vacancy was filled by the appointment of C. F. Jackson, Assistant in Zoology at the Ohio State University. Mr. Jasper F. Eastman, a graduate of the Massachusetts Agricultural College, was appointed as assistant Agriculturist in September, 1907. Mr. I. M. Lewis, teaching fellow in botany, University of Indiana, was appointed assistant botanist in June, 1908. Since the separation of the

Department of Animal Husbandry from the old Department of Agriculture, the name of the latter has been changed to the Department of Agronomy.

It gives me pleasure to state that the members of the staff have shown a cordial spirit of co-operation and sincere desire not only to make experiments and do research work of fundamental value, but in every way possible to advance the agricultural interests of the state. Few experiment stations of the size and with the resources of this station have a staff with equal ability, and if sufficient resources be placed at their command there is no question but that this station can do much for the agricultural uplift of New Hampshire.

#### FUNDS.

By the passage of the Adams Act in March, 1906, the Station has had an increase in funds over the \$15,000 annually appropriated under the Hatch account, of \$7000 for the year 1906-7 and \$9,000 for the year 1907-8. The Adams Act specifically states that the funds appropriated under it must be used for "conducting original researches or experiments bearing directly on the agricultural industry of the United States." It has become necessary to sharply differentiate the type of work to be done under the Adams fund from that under the Hatch account. Investigations under the Adams fund must be carried on for a series of years and the projects should be adopted only after careful consideration as to the facilities for their prosecution and their relations to the general agricultural interests of the state; but once commenced these projects should be given liberal financial support, both as regards salaries and equipment and should be continued for an indefinite period until completed. These projects under the Adams fund should be such that in the case of the resignation of members of the staff, the selection of new men would be determined upon their ability to continue these projects, rather than having the projects to be carried on determined by the personality of the staff.

On the other hand the work under the Hatch fund may now well consist of experiments having to do with the methods of culture and growth of crops, the improvement of varieties for local conditions and other similar lines of work which may involve investigations of only one or two seasons and which may well be of a more immediate practical nature, but we cannot under the Hatch fund carry on educational work and its income must be used strictly for experiments and investigations. Practically all the running expenses of the Experiment Station

must necessarily be met from the Hatch fund and with the enlargement of the work in the various departments it is increasingly difficult to care for the necessary expenses without exceeding the appropriation under this fund.

#### PUBLICATIONS.

The following publications have been issued since Nov. 1, 1906:

##### *Bulletins.*

- No. 128. The Brown-tail Moth and the Gipsy Moth in New Hampshire in 1906. E. Dwight Sanderson and Dr. L. O. Howard. January, 1907. Pgs. 22, figs. 8. Edition 15,000.
- No. 129. Seventeenth and Eighteenth Annual Reports. W. D. Gibbs, et al. January, 1907. Pgs. 48, figs. 3. Edition 11,000. (Pages 319-342, figs. 1-7, Apple Insects, and pages 343-353, figs. 8-10, Shade Tree and Woodland Insects, Plates 1-14 inc., as published in the 28th Report of New Hampshire College, were omitted in Bulletin 129, and the figures in Bulletin 129 were not renumbered.)
- No. 130. Inspection of Fertilizers in 1906. Fred W. Morse. February, 1907. Pgs. 8. Edition 11,000.
- No. 131. Spraying the Apple Orchard. E. Dwight Sanderson, T. J. Headlee and Charles Brooks. April, 1907. Pgs. 48, figs. 36. Edition 15,000.
- No. 132. A Plan for Improving the Quality of Milk and Cream Furnished to New Hampshire Creameries. Ivan Comings Weld. May, 1907. Pgs. 12, figs. 6. Edition 15,000.
- No. 133. The Inspection of Feeding Stuffs in 1907. Fred W. Morse. November, 1907. Pgs. 8. Edition 11,000.
- No. 134. Fertilizer Analysis. Fred W. Morse and Bert E. Curry. December, 1907. Pgs. 8. Edition 11,000.
- No. 135. The Respiration of Apples and its Relation to Their Keeping. Fred W. Morse. February, 1908. Pgs. 8, figs. 1. Edition 15,000.
- No. 136. The Gipsy and Brown Tail Moths in New Hampshire. E. Dwight Sanderson. February, 1908. Pgs. 63, figs. 34. Edition 25,000. (Printed by order of the Governor and Council.)
- No. 137. Strawberries for New Hampshire. H. F. Hall, May, 1908. Pgs. 32, figs. 8. Edition 15,000.



- No. 138. Humus in New Hampshire Soils. Fred W. Morse. June, 1908. Pgs. 16, figs. 3. Edition 15,000.
- No. 139. Caterpillars injuring Apple Foliage in Late Summer. E. Dwight Sanderson. July, 1908. Pgs. 24, figs. 13. Edition 15,000.

*Circulars.*

- No. 1. Mixing Chemical Fertilizers on the Farm. Fred W. Morse. April 1, 1908. Pgs. 4. Edition, 1,000.
- No. 2. Testing Soils for Fertilizer Needs. F. W. Taylor. April 1, 1908. Pgs. 2. Edition 1,000.
- No. 3. The Apple Aphis. E. Dwight Sanderson. August 1, 1908. Pgs. 6, figs. 4. Edition 1,000.
- No. 4. Oyster Shell Scale. E. Dwight Sanderson. August, 1908. Pgs. 4, figs. 3. Edition 1,000.
- No. 5. The San Jose Scale. E. Dwight Sanderson. August 25, 1908. Pgs. 12, figs. Edition 1,000.
- No. 6. A Circular of Information Concerning the New Hampshire Agricultural Experiment Station. September, 1908. Pgs. 16, figs., 10. Edition 5,000.
- No. 7. Some Essentials in Farm Butter Making. Fred Rasmussen. Sept. 5, 1908. Pgs. 2. Edition 1,000.

*School Bulletins.*

- No. 1. Agricultural Educations thru Rural Schools. E. Dwight Sanderson. May, 1908. Pgs. 20, figs. 6. Edition 3,000.
- No. 2. Soil Studies. F. W. Taylor. May, 1908. Pgs. 24, figs. 13. Edition 3,000.
- No. 3. Seeds and Seedlings. Charles Brooks. September, 1908. Pgs. 16, figs. 9. Edition 3,000.

*Scientific Contributions.*

- No. 1. The Influence of Minimum Temperatures in Limiting the Northern Distribution of Insects. E. Dwight Sanderson. Reprint from the "Journal of Economic Entomology," Vol. 1. August, 1908. Pgs. 20, maps 7.
- No. 2. The Fruit Spot of Apples. Charles Brooks. Reprint from the Bulletin of the Torrey Botanical Club, Vol. 35, September, 1908. Pgs. 50, plates 7.

Twelve press circulars have also been issued and sent to the agricultural press of this state and New England, which are reprinted in this volume.

A new departure in the publications of the station is the series of circulars, which now number seven, which are designed

to give a brief popular summary of the available information on topics about which the station frequently receives requests for information. These circulars are not sent to the general mailing list but are sent to the press and are used in answering correspondence.

In an effort to advance the interests of agriculture and nature study in the rural schools, the Station has prepared and issued three numbers of the New Hampshire College School Bulletin, which is sent to all the teachers of the state free of charge. This is practically a continuation of the old series of Nature Study Leaflets, but it is hoped that it may have a somewhat wider scope and may become a useful link in connecting this institution with the rural schools of the state, and toward encouraging the teachers of our rural schools to look to us for help and encouragement in the introduction of agricultural and nature study work in the common schools of the state.

Inasmuch as this report covers the 20th year since the organization of the Station, it has seemed fitting that a complete list of its publications and a full index to them should be made. Such an index has been therefore appended to the present volume.

#### ADDITIONS TO EQUIPMENT.

In the fall of 1907 a sheep barn was erected at a cost of about \$1,200 for the work in sheep breeding. An implement barn for the Horticultural Department was also erected for housing the tools of this department. The northeastern room on the first floor of Morrill Hall, formerly an agricultural reading room, is now used as the library of the Experiment Station and has been fitted with steel stacks and suitable furniture, making the agricultural literature immediately available to the agricultural workers located in this building.

#### EQUIPMENT NEEDED

*Buildings.* I beg to call attention to the recommendation of the Animal Husbandman that a suitable hog barn be built, in which feeding experiments with hogs can be carried on. The Station should be doing some work along this line, but with the present barn facilities it is useless to attempt any hog feeding experiments. The present dairy barn has been severely criticized from several sources for the lack of adequate ventilation, and for the fact that there is no adequate provision for the housing of the manure. I would recommend that suitable metal ventilators be put in, which it is estimated can be done at a cost

of \$250. Plans have been prepared by Prof. Taylor for a manure shed 33x20 feet, with cement floor and carriers running thru the alley-ways of the barn and into this shed, which it is estimated would cost about \$366. At the present time it is expected that the manure be hauled every day or two but it is frequently desirable to have on hand a quantity of manure for dressing land for experimental work and it is both unsightly and unsanitary to have this accumulate at the end of the barn.

The botanist and the chemist are in immediate need of a greenhouse, in which plants can be grown thruout the season. The botanist needs this for work on plant diseases and the chemist for studies in the relation of plant growth to the chemical composition of the soil. It does not seem feasible to use any of the present greenhouses for this purpose. Such a greenhouse might readily be attached to Nesmith Hall and could probably be built and equipped for about \$1,500.

It has been impossible for the dairyman to carry on any experimental work at the Station owing to the lack of room and equipment in the present creamery building. If experimental work is to be carried on in dairying, we must have a building with facilities for such work. A mere creamery building will not furnish such facilities. It would seem that the dairy interests of New Hampshire are sufficient to warrant this Station making the dairy problems one of its leading lines of investigation, but nothing in the line of dairy manufactures can be done until a suitable building is provided.

#### LAND.

With the amount of land now devoted to sheep pasturage, there has been an insufficient amount of pasture for the dairy herd on the college farm during the past two seasons. Much of the pasture on the farm is of very little value. It has been necessary during the past season to rent pasture for the sheep, and this will continue to be necessary unless more pasture lands can be secured for the work of the Station. The renting of pasture not only involves some expense but it is exceedingly inconvenient for the herdsmen to have the flocks separated in several localities, and as the station is hardly warranted in properly fencing rented land, the danger from injury by dogs is increased. There is also practically no land available on the college farm which is suitable for experiments in corn culture such as are now being carried on by the Agronomy department with ear row tests of corn and similar work, as it has been difficult to find over a fraction of an acre of similar soil any place on the farm.

It has been necessary, in order to carry on experiments in fruit culture, to rent an orchard at Packer's Falls for a term of ten years. Both the writer and the horticulturist have examined all parts of the college farm as regards its adaptation to growing a permanent orchard for experimental work, and there seems to be no land either suitable or available for planting an orchard of reasonable size which might in the future be used for experiments in fertilization, spraying or the culture of the apple. In the future fruit growing will be a larger industry in New Hampshire than it is today and it would seem that it is high time for the Station to be planting an orchard which will be available for work in years to come, for orchards cannot be created in a day and there are practically no orchards within a reasonable distance of the station, available for such work. It is evident that a considerable addition to the land available for the work of the station should be provided in the near future.

#### EXHIBITS.

The Station made exhibits at both the Concord State Fair and the Rochester Fair in September, 1908, and at the Union Grange Fair, Plymouth, N. H., October 6, which attracted considerable favorable attention. The principal features were demonstrations of a working home dairy and of packing apples in boxes and pruning young fruit trees. Specimens of various injurious insects, plant diseases, different varieties of grains and fodder crops, fertilizers and feeds, as well as products of the gardens and farm were shown. Circular No. 6 was prepared for distribution at these fairs and it is trusted that as a result, the agricultural public has a better understanding of the work of the Station and will be brought into closer touch with it.

#### RECOMMENDATIONS.

*Publications.* At the present time the funds available for the publications of the station are entirely consumed by the publication of experiments and investigations at this station. During the past 20 years there has been an immense amount of experimental work done thruout the country, much of which is of equal or more value to New Hampshire farmers than that carried on here, but which having been published by other stations does not come to the attention of our residents. Much of this work has now become part of the best agricultural practice and still, relatively few New Hampshire farmers are making use of it. Time and again the desirability of publishing a bulletin upon some line of work of which this station has made no par-

ticular investigation arises, but our resources do not warrant such a publication. In a majority of the states the state government is paying for the publications of the Experiment Station either by direct appropriation or by ordering them printed by the state printer. Inasmuch as no appropriation has ever been made by the State of New Hampshire for the work of the experiment station, I beg to suggest that the Board of Trustees lay this matter before the next legislature, endeavoring to secure the printing of the station publications by the state, thus enabling us to publish more of value to New Hampshire farmers, and thus relieving the Hatch Fund to a slight extent.

*Demonstration Experiments.* The New Hampshire Agricultural Experiment Station has been supported almost wholly by the federal government for the past 20 years, having received from the Hatch and Adams fund about \$325,000, the only other income being from the analyses of fertilizers and feeding stuffs for the State Board of Agriculture. Much work of very real value has been accomplished and published, but we are often led to question whether the farmers of New Hampshire, as a whole, have made the best use of this institution maintained in their interest. It is undoubtedly a fact that many of its publications are unread and many more unheeded, and as suggested above, the publications which have been issued cover merely the investigations of this station. During the same period at least \$15,000,000 has been expended by the various state experiment stations aside from the immense appropriations now being made to the national Department of Agriculture, as a result of which the art of agriculture has been revolutionized during this period and the process is still going on. If it is a fact that the farmers of New Hampshire are not putting into practical use the results of this work to the extent which they should to secure the best returns from their business, and to insure the general prosperity of the state, the question arises whether we cannot in some way devise means for bringing them into touch with the work of the experiment station and bringing the results of the work of this and other experiment stations to their immediate attention in such a way as will lead them to make use of it. It is the writer's firm belief that the state needs such work at the present time very much more than it needs scientific investigations, for it is of very little value to New Hampshire for us to conduct even the best scientific investigations if the results are to be unheeded.

Two types of work might be carried on by this station with



undoubted promise of success for the betterment of New Hampshire agriculture.

*Demonstration and co-operative experiments.* Experience in all parts of the country has demonstrated that practical demonstrations of better farm methods are of immeasurably more value in securing the adoption of such methods by the farmer, than is the free literature sent him in abundance or the numerous addresses which he hears at farmers' institutes and other farmers' meetings. This has been most thoroly demonstrated by the work of the U. S. Dept. of Agriculture in the south, but has also been repeatedly illustrated elsewhere and has been shown to be true in our own experience in this state in what little work we have done co-operatively with fruit growers and dairymen. The Station should be able to take a number of the old orchards which still have possibilities in them, and demonstrate by spraying, pruning and cultivation, what can be done for them and what profit there is in fruit growing with up to date methods. Much the same line of work might well be carried on with the packing and growing of vegetables and potatoes. The hay crop is the principal crop of the state, 83 per cent. of the area devoted to crops in New Hampshire being in hay. But we realize only \$10 per acre from it, with a yield of 9-10 of a ton per acre. A larger proportion of the cultivated land is in hay in New Hampshire and the crop yields less per acre in New Hampshire than in any other eastern state except Maine. This is very largely due to the fact that fields are often left in hay for 8, 10 or 15 years, and it is the experience of all practical men, that the amount and quality of the crop usually decreases steadily after about the sixth year. If demonstrations made by this station could secure an increase in the hay crop of 1-10 ton per acre for the state, it would mean an increase of \$600,000 annually in the value of New Hampshire's hay crop. If a large number of small demonstration experiments were made in co-operation with local granges, the value of frequent rotations and proper fertilization of hay land could be so completely demonstrated and so thoroly proven that there is no question that an even greater increase in the yield than this, could be secured. In the state of Iowa the average yield per acre of corn has been increased several bushels in the last few years thru the work of the state experiment station in demonstrating the methods of seed selection, which has meant an increase of over \$10,000,000 annually in the value of the crop in that state. When a sta-

tion can do work of this kind there is no question that its maintenance is worth while, and if its recommendations can be so proven, there will be practically no question upon the part of the farmer or of the general public as to whether money appropriated for such work is worth while.

*Survey Work.* Complaint is heard on all sides of the lack of profit in agricultural pursuits in New Hampshire. Yet in all lines of agricultural industry there can be found many men scattered thruout the state who, without unusual opportunity or resources, have made an eminent success of their chosen line of agricultural work and if not becoming wealthy are making an exceedingly comfortable living. The success of these men disproves the pessimism of many who lack their ability. There is no question that a study of the methods employed by such men would be of as much value to the agricultural interests of the state as are many of the investigations carried on here or elsewhere. Again it is highly desirable to know just what crops are being grown in various portions of the state, how they are being grown and just where in their culture the profit or loss occurs. This has been done by us to some extent in a survey of the apple orchards of southern New Hampshire, which is still uncompleted, and a survey of the farm dairy methods is now being made. Such work is necessarily slow and costly but when carefully done it shows conclusively the methods in use and how profits are being made or losses sustained. With such data in hand the station can plan its investigations and can make demonstrations which will show the more profitable methods and can base such demonstrations not only on its own work but by pointing to the work and success of practical men who have achieved results thru their own efforts. Such work is now being carried on by the U. S. Dept. of Agriculture and is being taken up in several other states.

I would urge that sufficient appropriations be secured so that the station may be provided with funds for carrying on such demonstrations and co-operative experiments and agricultural surveys. No other agency in the state is as suitably organized or equipped for doing such work. That the time is ripe for it can be readily appreciated by anyone who will visit the farmers, dairymen and fruit growers of New Hampshire, as representatives of the station have done during the past year, and note the need for such work and the desire on their part that we should be about it.



## INVESTIGATIONS.

The investigations and experiments of the various departments completed and now in progress are discussed fully in the reports of the heads of the various departments, which are submitted herewith. Several pieces of work have been reported in bulletins published within the last two years, the nature of which is sufficiently indicated from the titles cited above.

Respectfully submitted,

E. DWIGHT SANDERSON,

*Director.*

DURHAM, N. H., Nov. 1, 1908.

## NINETEENTH ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE HATCH FUND

FOR THE YEAR ENDING JUNE 30, 1907.

### Receipts.

Cash received from United States treasurer..... \$15,000.00

### Expenditures.

Cash paid for salaries .....	\$7,907.63
labor .....	2,641.24
publications .....	1,195.87
postage and stationery.....	152.32
freight and express.....	189.59
heat, light, water and power.....	222.25
chemical supplies .....	124.08
seeds, plants and sundry supplies....	591.78
fertilizers .....	231.02
feeding stuffs .....	20.17
library .....	229.06
tools, implements, and machinery....	434.00
furniture and fixtures.....	56.17
scientific apparatus .....	213.09
live stock .....	206.17
traveling expenses .....	453.22
contingent expenses .....	16.16
buildings and land.....	116.18

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\$15,000.00

## SECOND ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE ADAMS FUND

FOR THE YEAR ENDING JUNE 30, 1907.

### Receipts.

Cash received from United States treasurer..... \$7,000.00

### Expenditures.

Cash paid for salaries .....	\$4,556.60
labor .....	589.19
freight and express.....	131.44
chemical supplies .....	16.44
seeds, plants, and sundry supplies....	385.89
feeding stuffs .....	146.93
tools, implements and machinery.....	14.90
scientific apparatus .....	615.26
live stock .....	105.00
traveling expenses .....	93.22
buildings and land.....	345.13
	<hr/>
	\$7,000.00

## SUPPLEMENTARY STATEMENT OF FUNDS OTHER THAN THE HATCH AND ADAMS FUNDS

FOR THE YEAR ENDING JUNE 30, 1907.

### Receipts.

Cash received, analytical fees, etc..... \$2,012.42

### Expenditures.

Cash paid for labor .....	\$265.87
heat, light, water and power.....	500.00
seeds, plants and sundry supplies....	20.40
library .....	135.50
scientific apparatus .....	748.86
live stock .....	122.69
buildings and land.....	53.26
balance .....	165.84
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	\$2,012.42

# TWENTIETH ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE HATCH FUND

FOR THE YEAR ENDING JUNE 30, 1908.

## Receipts.

Cash received from United States treasurer..... \$15,000.00

## Expenditures.

Cash paid for salaries .....	\$7,620.66
labor .....	2,543.22
publications .....	747.52
postage and stationery.....	418.40
freight and express.....	147.09
heat, light and water.....	662.58
chemical supplies .....	40.66
seeds, plants, and sundry supplies.....	615.53
fertilizers .....	138.75
feeding stuffs .....	41.01
library .....	664.60
tools, implements, and machinery....	133.40
furniture and fixtures.....	303.16
scientific apparatus .....	176.15
contingent expenses .....	15.00
traveling expenses .....	498.49
buildings and land.....	233.78
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	\$15,000.00

# THIRD ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE ADAMS FUND

FOR THE YEAR ENDING JUNE 30, 1908.

**Receipts.**

Cash received from United States treasurer..... \$9,000.00

**Expenditures.**

Cash paid for salaries .....	\$5,516.88
labor .....	1,053.21
freight and express.....	34.30
chemical supplies .....	92.82
seeds, plants and sundry supplies....	293.76
fertilizers .....	67.28
library .....	134.53
tools, implements and machinery....	183.50
scientific apparatus .....	423.82
live stock .....	598.50
traveling expenses .....	152.70
buildings and land.....	448.70

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 \$9,000.00

## SUPPLEMENTARY STATEMENT OF FUNDS OTHER THAN THE HATCH AND ADAMS FUNDS

FOR THE YEAR ENDING JUNE 30, 1908.

**Receipts.**

Cash received, analytical fees, etc..... \$1,994.46

**Expenditures.**

Cash paid for salaries .....	\$241.70
labor .....	772.76
publications .....	116.22
postage and stationery.....	18.88
freight and express.....	.30
seeds, plants and sundry supplies....	15.88
feeding stuffs .....	401.24
tools, implements and machinery....	25.45
traveling expenses .....	133.69
contingent expenses .....	1.50
buildings and land.....	266.20
balance .....	.64

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 \$1,994.46

## AUDITOR'S STATEMENT.

The undersigned, duly appointed auditor of the corporation, hereby certifies that he has examined the books and accounts of the New Hampshire Agricultural Experiment Station for the two fiscal years ended June 30, 1908; that he has found the same well kept and classified as above, and that the receipts for the two years from the treasurer of the United States are shown to have been \$22,000, and \$24,000, respectively, and the corresponding disbursements, \$22,000, and \$24,000 respectively, for all of which proper vouchers are on file and have been examined and found correct.

And it is further certified that the expenditures have been solely for the purposes set forth in the acts of Congress approved March 2, 1887, and March 16, 1906.

(Signed)

C. H. PETTEE,  
*Auditor.*

Attest:

WALTER M. PARKER,  
*Custodian.*

## REPORT OF THE DEPARTMENT OF CHEMISTRY.

BY FRED W. MORSE AND BERT E. CURRY.

The Department of Chemistry has been unchanged in its organization throughout the biennial period. Its miscellaneous work has been of the same character as in preceding years. Included in this class of work are the analyses of fertilizers and feeding-stuffs for the State Board of Agriculture in the annual inspection of those goods. The amount of inspection work varies but little from year to year. In 1907, 85 samples of feeding-stuffs and 114 samples of fertilizers were examined, while for the year 1908, 75 feeding-stuffs and 96 fertilizers have been analyzed.

Some miscellaneous materials have been received from individual citizens, and when of public interest they have been analyzed. The work has been limited almost wholly to feeding-stuffs, manurial substances and soils. In the last named, only organic matter and acidity have been estimated.

The department has co-operated with other departments of the station and has made numerous analyses of insecticides for the entomological department and of fungicides for the botanical department. For the last-named it has also analyzed a series of samples of apple twigs and leaves for fertilizing constituents.

The investigations of the department have been conducted almost wholly under the Adams Fund. They have included a study of the manurial requirements of the soils of the college farm, especial attention being given to the element potassium. Several lines of laboratory studies have been conducted to determine the relation of clay and humus to potassium salts and lime; the effect of various manurial materials on the soil potash; the nature of soil acidity; the effect of lime on nitrification in a clay soil; and some preliminary work on the burning effects produced by Bordeaux mixture on foliage.

In following pages, under appropriate headings, there are given the results of these different investigations so far as they are complete. Some are still under way and will require one or more seasons further study to reach any reliable conclusions.

Under the Hatch Fund, the department has co-operated with the Association of Official Agricultural Chemists in the study of methods of cattle-food analysis.

In the analytical work, more especially on the feeding-stuffs and fertilizers, the department has had the assistance of F. W. Woodman, H. F. French, W. W. Evans and W. L. Adams, graduates of the chemical course in the college.

#### THE POTASH REQUIREMENTS OF A CLAY SOIL.

The types of soil included in these studies make up nearly the entire area of Durham and vicinity. They are of granitic origin and lie upon a foundation of either boulder clay or granite ledge, according to elevation. On the lowest levels the boulder clay becomes the subsoil and forms an important constituent of the top soil, while on the ridges the ledge frequently outcrops. The greater portion of the soil is a clay loam, changing to a sandy clay loam on the ridges and to clay on the low ground.

Analysis of the clay soil in 1893, by the conventional acid method showed an average of 1 per cent. of potassium oxide soluble in strong hydrochloric acid. This would mean not less than 15 tons of potash per acre locked up in the surface foot of soil. Nevertheless, potash salts appeared to produce some benefit on annual crops, such as corn and potatoes, and therefore the potash naturally present was looked upon as unavailable.

Observation, however, developed much practical evidence that the potash of the soil was sufficient for some crops, more especially grass, and that it was practically inexhaustible. In



the vicinity of the college many acres of hay land were known to have been cropped steadily for years with no treatment to renew them, and the yield rose and fell with the character of the season, and was governed by the rain fall. Testimony from practical farmers was obtained to the effect that gas lime and leached wood-ashes produced good results when applied as fertilizer, instead of complete manures. All tended to show that it was possible to make use of the soil's mineral constituents without resorting to the purchase of potash.

Studies were begun in 1905 to determine something about the character of the potash in these soils, and how it could be most readily made use of, and they have continued to the present time, and are not yet completed. But data have been accumulated which make it possible to report a partial solution of the problem.

The work of the first two years was carried on to determine if any relationship existed between the hay crop and the soil on which it grew. By analyzing the grass-crop and the soil upon which it grew, there could be determined the proportional relation, if any, between them. On the other hand, if there were no proportion between potash in crop and potash in soil, it would point to the conclusion that even in the soils poorest in potash, there was a sufficient amount of that element for the plants.

The samples were gathered from different fields on the college farm. A carefully measured square yard was taken as the area from which to cut the grass and to sample the soil. The grass was cut in July just in advance of haying, and dried under cover. The soil sample was taken by boring with an auger to the depth of eight inches, except on the low clay soil, where a depth of six inches always reached the dense sub-soil.

The crop sample after drying, was weighed, chopped up fine, and sub-sampled for subsequent analysis. The soil was dried at air temperature, sifted through a 1-millimeter sieve and the fine soil used for analysis.

The crop-sample was incinerated in a muffle-furnace and the analysis conducted essentially in accordance with the methods of the Association of Official Agricultural Chemists. The mineral constituents of the soil were, however, determined by the conventional fusion methods instead of in an acid solution. This was done because it was desirable to know the possibility of exhaustion of the soil, and it is well known that the strong hydrochloric acid gives neither total constituents, nor available matter. Fusion of the fine soil obtained by sifting through the

standard millimeter sieve was practically complete, as there were but slight gritty residues left in the subsequent solutions.

The following table gives the results obtained for the oxides of potassium, sodium, calcium and magnesium, and the samples are grouped as upland and lowland:

TABLE 1. *Composition of Soil. Lowland.*

Sample.	Potash.	Soda.	Magnesia.	Lime.	*Potassium Sol. in Water.
I .....	2.28	1.30	0.92	1.03	*15.8
VI .....	2.47	1.21	1.01	0.88	22.3
VII .....	2.78	1.40	1.27	1.03	9.9
VIII .....	3.22	1.08	1.38	0.97	18.0
IX .....	3.16	1.35	1.42	1.02	21.9
X .....	3.56	1.49	1.46	1.08	12.1
XIII .....	3.46	1.10	1.48	0.87	35.1
XV .....	3.56	0.87	1.66	0.90	22.4
XVI .....	2.21	1.18	1.81	1.67	16.2
XVII .....	3.19	0.96	1.24	1.10	6.0
XVIII .....	3.96	1.36	1.22	0.97	13.1
XXIV .....	2.59	1.06	1.05	0.87	26.0
Mean .....	3.04	1.19	1.33	1.03	18.2

\*Parts per million of soil.

TABLE 2. *Composition of Soil. Upland.*

Sample.	Potash.	Soda.	Magnesia.	Lime.	*Potassium Sol. in water.
II .....	2.07	1.83	0.81	1.09	*13.8
III .....	2.32	1.81	0.82	0.99	11.4
IV .....	2.40	1.32	1.11	0.94	8.3
V .....	2.07	1.26	0.87	0.97	12.3
XI .....	2.75	1.40	1.35	1.01	17.1
XII .....	2.32	1.29	0.81	1.00	13.4
XIV .....	2.19	1.22	0.89	0.75	18.2
XXI .....	2.05	1.74	0.81	0.97	12.5
XXII .....	2.07	1.17	...	0.83	6.1
XXIII .....	2.29	1.47	0.77	0.96	18.4
Mean .....	2.25	1.45	0.91	0.95	13.1

\*Parts per million of soil.

The water-soluble potassium was also determined in the air-dried soil by the method of the Bureau of Soils, and the results are given in the last column of the table. The most prominent facts in these results are that both total potash and water-soluble potassium average higher in the lowland soil than in the upland, or may be considered as varying proportionally with the clay. It is also interesting to note that the average ratio of soluble potassium to total potash is the same for the two classes of soils, although fluctuations are wide in individual soils.

In the examination of the crops, determinations were made of the bases included in the soil analyses, and in addition nitrogen and phosphoric acid. The results of the analyses are given in the following tables, where the samples are numbered and grouped as in the soil table:

TABLE 3. *Composition of Crop. Lowland.*

Sample.	Potash.	Soda.	Magnesia.	Lime.	Phos. Acid.	Nitrogen.	Water.
I .....	0.84	0.20	0.16	0.29	0.41	0.87	10.66
VI .....	1.02	0.15	0.16	0.37	0.37	0.82	11.10
VII .....	1.18	0.14	0.13	0.29	0.36	0.57	9.68
VIII .....	1.29	0.08	0.20	0.48	0.40	0.86	10.45
IX .....	1.24	0.14	0.29	0.52	0.43	0.98	10.57
X .....	1.31	0.15	0.29	0.76	0.36	1.16	9.55
XIII .....	1.27	0.09	0.28	0.78	0.46	0.70	10.41
XV .....	1.40	0.14	0.33	0.94	0.39	1.12	9.20
XVI .....	1.65	0.07	0.24	1.00	0.34	1.14	9.35
XVII .....	0.98	0.10	0.16	0.50	0.40	0.77	12.10
XXIV .....	1.48	0.16	0.15	0.28	0.45	0.78	15.10

TABLE 4. *Composition of Crop. Upland.*

Sample.	Potash	Soda.	Magnesia.	Lime.	Phos. Acid.	Nitrogen.	Water
II .....	1.46	0.18	0.21	0.51	0.41	0.82	9.48
III .....	1.01	0.12	0.14	0.28	0.31	0.65	9.43
IV .....	0.79	0.11	0.19	0.37	0.36	0.78	9.65
V .....	1.14	0.11	0.17	0.38	0.41	0.75	10.15
XI .....	1.47	0.09	0.27	0.65	0.40	1.10	10.22
XII .....	1.08	0.13	0.20	0.54	0.39	1.11	8.57
XXI .....	1.21	0.10	0.14	0.31	0.37	0.74	10.82
XXII .....	1.01	0.09	0.16	0.29	0.45	0.88	11.02
XXIII .....	1.08	0.08	0.16	0.32	0.38	0.74	12.85

In collecting the samples it was very noticeable that there were marked variations in the character of the herbage, and that the number of different species of grasses and other plants, varied with the age of the sod. On the newer fields, timothy, red-top and clover were practically free from other species, while on the oldest sod, their places had been taken by wild grasses. Yields also varied widely, as is always noticeable in mowing fields of different ages.

No proportional relation could be traced between the composition of the crop and that of the soil. Fluctuations in the percentage composition of the crop apparently depended more on the kinds of grasses composing it. Calculations of the amount of potash removed by the crop did not show defined proportion between soil potash, total or soluble, and that absorbed by growth. These comparisons are grouped in the following table:

TABLE 5. *Comparison of Potash in Soils and Crops. 1905.*

Sample.	Soil		*Yield of Hay.	Crop	
	Percent. Potash.	Soluble Potassium.		Percent. Potash.	*Potash Absorbed.
I .....	2.28	15.8	*2,576	0.84	*24.37
VI .....	2.47	22.3	3,929	1.02	45.05
VII .....	2.78	9.9	4,337	1.18	56.67
VIII .....	3.22	18.0	2,515	1.29	36.23
IX .....	3.16	21.9	2,000	1.24	27.85
X .....	3.56	12.1	1,828	1.31	26.46
XIII .....	3.46	35.1	3,483	1.27	62.43
XV .....	3.56	22.4	2,455	1.40	37.84
XVI .....	2.21	16.2	2,344	1.65	40.48
XVII .....	3.19	6.0	3,570	0.98	39.75
II .....	2.07	13.8	2,051	1.46	32.95
III .....	2.32	11.4	4,042	1.01	45.05
IV .....	2.40	8.3	4,019	0.79	35.17
V .....	2.07	12.3	2,803	1.14	35.53
XI .....	2.75	17.1	5,135	1.47	84.04
XII .....	2.32	13.4	3,253	1.08	38.39

\*Pounds per acre, calculated from sample.

It was noticeable that increased yield was accompanied, as would be expected, by increased draft of potash from the soil.

In 1906 we repeated the study of the composition of the grass crop on seven of the locations used in 1905. The results are given in the table below, omitting all but the data pertaining to potash. The work was corroborative of that of the previous year.

TABLE 6. *Comparison of Potash in Soils and Crops. 1906.*

Sample.	Soil		*Yield of Hay.	Crop	
	†Percent. Potash.			Percent. Potash.	*Potash Absorbed.
VII .....	3.22		3,322	1.44	47.74
IX .....	3.16		3,716	1.34	49.72
X .....	3.56		1,846	1.54	28.60
XVII .....	3.19		2,310	1.65	38.06
XVIII .....	3.96		4,065	1.60	64.90
XXIV .....	2.59		4,461	1.70	75.81
XI .....	2.75		4,770	1.34	63.58
XIV .....	2.19		4,312	1.39	59.75
XXI .....	2.05		4,046	1.11	44.90
XXII .....	2.07		2,756	0.61	16.81
XXIII .....	2.29		2,224	0.82	18.24

\*Pounds per acre.

†Results of 1905.

Since the drain of potash from this soil was thus shown to be proportional to the yield, an important question arose,

whether with increased yield due to non-potash fertilizers, there would be a decrease in available potash as time went on, or could the residual potash of the soil go into solution rapidly enough to meet increased demands of vigorous plant-growth, and therefore an indefinite series of crops be grown without the application of potash salts.

We were enabled to take up the study of this question in 1907 by means of a series of fertilizer experiments conducted by the Agricultural Department, and can make a partial report of results of two years' study.

The plots were so arranged that every fertilized plot was checked by a parallel plot with no fertilizer, while one-half of every plot was dressed with lime. The areas were one-tenth of an acre in each case. Each plot was seeded with grass in 1906. The fertilizer was applied as a top-dressing, beginning the year after seeding. In 1907 many of the plots were well mixed with alsike clover; but in 1908 it was almost entirely absent. The soil of these plots was of the type included in the lowland group and hence was strong in total potash.

The crops were sampled for analysis on the day they were cut for hay, in both seasons. In 1907 the clover and grasses were so unevenly mixed in the crop that grasses were sorted from clover and separate analyses made of each.

At this time it is possible to discuss the results obtained by the application of potash salts, land-plaster, wood-ashes, and nitrogen, for fertilizers. The discussion will be confined to the results obtained for potash in the crops, as the other constituents of the 1908 crop have not yet been determined.

#### EFFECT OF POTASH SALTS.

Potash salts, both muriate and sulphate, gave no appreciable increase in yield of crop or in percentage of potash in either grasses or clover in 1907, while in 1908, except for a slight excess for the crop on sulphate of potash over its adjoining check plots, the results were the same. The addition of 30 and 60 pounds per acre of soluble potash did not increase the concentration of that constituent in the plants.

The water-soluble potassium in the soil was also unaffected, and the potash salts must have been changed into insoluble compounds. Neither grasses nor clover show any increase in percentage of potash due to added potash fertilizers, although the latter crop is supposed to be readily affected by such manuring.



TABLE 7. *Yield and Potash Content on Potash Series. 1907.*

Plot. Fertilizer.	Yield.	Potash in Grasses. Dry Matter.	Potash in Clover. Dry Matter.	Soluble Potassium in Soil.
11. None .....	5,202	2.19	2.93	*6.18
12. Muriate. 30 lbs. Potash per A.	4,830	2.18	2.89	6.1
13. Sulphate. 30 lbs. Potash per A.	4,876	2.11	2.55	5.7
14. None .....	4,902	2.05	2.40	5.0
35. None .....	3,850	1.67	2.02	5.5
36. Muriate. 60 lbs. Potash per A.	4,176	2.03	2.01	5.8
37. Sulphate. 60 lbs. Potash per A.	3,814	1.94	2.56	6.6
38. None .....	3,904	1.96	2.69	8.2

TABLE 8. *Yield and Potash Content on Potash Series. 1908.*

Plot. Fertilizer.	Yield.	Potash in Air-dry Hay.	Soluble Potas- sium in soil.
11. None .....	2,814	1.87	*7.2
12. Muriate .....	2,016	1.93	7.6
13. Sulphate .....	2,452	1.56	7.0
14. None .....	2,316	1.33	8.0
35. None .....	5,866	1.48	7.9
36. Muriate .....	4,776	1.46	9.0
37. Sulphate .....	6,192	1.43	8.0
38. None .....	5,320	1.65	8.9

\*Parts per million of soil.

#### EFFECT OF NITROGENOUS FERTILIZERS.

In 1907 but one set of plots was sampled, those receiving nitrogen at the rate of 60 pounds per acre. In 1908 two sets were sampled. Although the nitrogen increased the yield at the rate of one ton per acre in 1907 and over one-half ton in 1908, the percentage of potash in the crop averaged fully as high in the heavy crop as in the lighter one. This is strong evidence that there is sufficient available potash to meet the demand of increased crops.

TABLE 9. *Yield and Potash Content on Nitrogen Series. 1907.*

Plot. Fertilizer.	Yield.	Potash in Grasses. Dry Matter.	Potash in Clover. Dry Matter.
25. Nitrate Soda. 60 lbs. Nitrogen per A.	5,676	1.65	1.66
26. None .....	3,450	1.82	1.49
27. Sulphate Am. 60 lbs. Nitrogen per A.	5,220	1.79	1.79



TABLE 10. *Yield and Potash Content on Nitrogen Series. 1908.*

Plot. Fertilizer.	Yield.	Potash in air-dry hay.
1. Nitrate Soda. 30 lbs. Nitrogen per A.....	7,054	1.25
2. None .....	5,674	1.28
3. Sulphate Ammonia. 30 lbs. Nitrogen per A.	6,446	1.54
25. Nitrate Soda .....	5,322	1.59
26. None .....	3,616	1.61
27. Sulphate Ammonia .....	4,292	1.62

## EFFECT OF LIME AND ITS COMPOUNDS.

As was stated in the description of the plots, lime was applied uniformly over one-half of each plot, checks as well as fertilized ones. Neither in 1907 nor in 1908 could the least effect be seen in the yield of grass or clover. Height and color were uniform for the entire plot in each instance, hence no samples were taken to determine any chemical effect on the plant. In another way this was studied by securing results from plots which were treated with land-plaster and wood-ashes, respectively.

The wood-ashes produced no results in 1907; but did increase the yield about 500 pounds per acre in 1908. The effect of the application was not perceptible on the composition of the crop. In neither year did land-plaster produce any increased results in yield or in percentage of potash in the crop.

TABLE 11. *Yield and Potash Content on Ashes and Plaster. 1907.*

Plot. Fertilizer.	Yield.	Potash in Grasses.	Potash in Clover.
		Dry Matter.	Dry Matter.
16. Land Plaster .....	5,566	2.07	2.64
17. None .....	5,610	2.56	2.45
38. None .....	3,904	1.96	2.69
39. Wood Ashes .....	4,176	Mixed 2.24 crop.	

TABLE 12. *Yield and Potash Content on Ashes and Plaster. 1908.*

Plot. Fertilizer.	Yield.	Potash in air-dry hay.
14. None .....	2,316	1.33
15. Wood Ashes .....	2,678	1.47
16. Land Plaster .....	2,398	1.39
17. None .....	3,088	1.54
38. None .....	5,320	1.65
39. Wood Ashes .....	5,902	1.59

So far as these two successive years' study show, it is evident that this soil has sufficient natural potash available for good crops of grass or clover. Applications of potash salts do not perceptibly affect the constitution of the plants, although the amount of soluble potash added would on some soils show marked results on both yield and composition.

Hence the crop and soil studies of four successive seasons, all point to the fact that potassium is not the limiting element in hay production on these strong clay soils. The drain on the soil-potash is proportional to the yield of crop as a general rule; but any treatment which will bring about increased production of the crop may be independent of potash, since the soil shows a capacity to meet any increased demand for that constituent.

## A STUDY OF THE REACTIONS BETWEEN THE MANURIAL SALTS AND CLAYS, MUCKS AND SOILS.

### INTRODUCTORY.

At the present time much is being said in agricultural literature about acid soils and soil acids. Poor crop yields are an indication that the soil is not in proper condition. This condition may be the result of one, or the combination of several factors. Some of these recognized factors are the physical condition of the soil, the absence of sufficient quantities of the ordinary manurial constituents, the presence of substances deleterious to plant growth and moisture, as well as the general climatic conditions. Certain tests are in general use to determine whether the disturbing factors are due to the presence of acids. According to these tests there are in this section very few soils, indeed, that do not react acid. Lime is generally recommended to sweeten these sour soils, or in other words to neutralize the acids.

The test in general use for soil acids is known as the litmus test and briefly, is as follows: The sample of soil under examination is moistened with distilled water and packed around a strip of blue litmus paper. If after several minutes the color of the litmus has changed from blue to pink, the soil is said to be acid.

A number of soils which give a decided acid reaction toward litmus have come under our observation. On the other hand field tests show that these soils are not in need of lime. In some instances excellent yields of grass were obtained in spite of the acidity. No difference could be detected between the growth on the limed and unlimed portions. At least one acid clay soil has come to our notice, where nitrogenous manures have produced increased yields, while lime, phosphoric acid, and potassium salts have been without any noticeable effect.

The water extract of soils seldom reacts acid, and, unless boiled, almost never alkaline. On the other hand, the water bath residues of the water extract of soils are nearly always

alkaline to phenolphthalein. This is true of the water extract of many soils that react acid and are responsive to applications of lime. We have found here but few instances where these residues were not alkaline. In this connection it might be noted that nearly all pond, spring and drainage waters are alkaline if heated to remove the carbon dioxide. A great many of the pond waters, even when highly colored, yield alkaline solutions when boiled. We have found no surface waters different from these.

A clay, practically free from organic matter, came to our notice. The water extract of this clay was neutral to methyl orange litmus and phenolphthalein, the water-bath residue alkaline to phenolphthalein, and the clay itself, decidedly acid toward litmus. Also when this clay was treated with a sodium chloride solution for a quantitative estimation of its acid content, a strongly acid solution was obtained. This last treatment was made according to the present provisional A. O. A. C. method \*for the estimation of the amount of acids in soils. The large amount of acid in solution was decidedly at variance with the amount of organic matter in the clay. The method is based on the assumption that the sodium salt reacts with the organic acids in the soil to form free hydrochloric acid and insoluble organic sodium salts. However, there are no data in evidence to justify this assumption, and, moreover, the effects of chemical reaction between the sodium salt and the inorganic soil constituents, as well as all absorptive properties of the clays, are notably ignored.

These general observations suggested a number of questions of sufficient interest to make a further investigation desirable.

In order to get at the basis of some of these phenomena, and to determine separately the behavior and properties of the clay and organic matter in the soils, we selected a type of clay commonly known as fuller's earth, as a representative of the clays, and a muck as a representative of the organic matter. This particular muck was selected because of its comparative freedom from inorganic material, and, also, because in common with most mucky soils, the salt solution extract was acid in character. The fuller's earth was selected because some preliminary work showed that it had the properties of the ordinary soils, but to a more pronounced degree. This is particularly advan-

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\*Bulletin 107, Page 20 U. S. Dept. Agr., Bureau of Chem.

tageous because of the facilities afforded when dealing with greater magnitudes than are usually met with in soil studies.

Schreiner & Failyer\* have shown that when dilute solutions of potassium chloride are percolated through soils, the potassium is removed from solution. In the same paper it is shown that phosphoric acid is likewise removed from mono-calcium phosphate solutions. They attribute the phenomena to the absorptive or adsorptive properties of the soil. The percolate was examined in the one case for potassium, and in the other for phosphoric acid, but attention is not directed to the other radicals of the salts.

Hall and Gimmingham\*\* show that when solutions of ammonium chloride and sulphate come in contact with clays the ammonia is removed from solution. They show the phenomenon in its final form to be a straight chemical reaction. For every equivalent of ammonia that goes out of solution an equivalent of calcium, magnesium, or some other base goes into solution. No portion of the acids were removed from solution. It is noted that there was no evidence of the removal of ammonia by absorption phenomena. The final solutions carried no iron and aluminum, and were not acid in character. These clays are different from many clays and soils, in so much as the sodium chloride solution extract carries no iron and aluminum. It has been our experience that such conditions are rare. We have found that where a soil or clay carries a high percentage of lime, no iron and aluminum go into solution. There is no evidence to show that these bases do not, however, continue to react with the ammonium salts. Solutions of the alkali salts extract large quantities of lime and usually magnesium from these soils.

According to Hopkins†, when soils are extracted with solutions of sodium chloride, the organic soil acids react with the sodium chloride to produce free hydrochloric acid. This reaction is quantitative, and the free acid can be titrated, and is equivalent to the original amount of acid present in the soil. Veitch‡ has shown that quantities of iron and aluminum are changed to a soluble condition under these conditions, and an acid solution is produced by the hydrolysis of these salts. When a clay free from organic matter gives reactions similar to the ordinary soils, the acid properties must be produced by some action other than the presence of organic matter.

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\*Jour. Phys. Chem. 10. 239, 1908.

\*\*Jour. Lon. Chem. Soc. 91. 677 (1907.)

†Bulletin 73, page 14, U. S. Dept. Agr. Bureau of Chemistry.

‡Journ. Amer. Chem. Soc. 26. 637, 1904.

*Reaction Between Clay and Salts.*

When fuller's earth is subjected to the tests usually applied to soils, it responds readily to the acid test. The moistened earth reddens blue litmus, and in contact with the alkali salts acid solutions are rapidly developed. These solutions are decidedly acid toward methyl orange. The earth is practically free from organic matter. When the water extract of this clay is boiled or evaporated to dryness, the residue is alkaline to phenolphthalein. Qualitative examination of the sodium, potassium, and ammonium chloride solution extracts discloses the presence of quantities of iron, aluminum, calcium and magnesium, and less amounts of sodium and potassium. Quantitative results† show that the final solutions contain less ammonia and potassium than the original. Quantitative determinations were not made for the sodium, but the same reactions must take place in such solutions.

*Reaction Products.*

In table 1 the results are given for the changes which take place between fuller's earth and a solution of potassium chloride.

TABLE I.

Amount of KCl removed from solution.			
Grams $\text{Al}_2\text{O}_3$ in solution	.2554	.5672	grams K
" $\text{Fe}_2\text{O}_3$ " "	.2395	.3523	" "
" $\text{CaO}$ " "	.3976	.4566	" "
" $\text{MgO}$ " "	.0392	.0784	" "

240 c.c. of tenth normal sodium hydroxide were required to precipitate the iron and aluminum. This is equivalent to 0.9486 grams K.

For this experiment 100 grams of clay, 15 grams potassium chloride and 400 c. c. water was used. These show that the clay had removed 1.45 per cent. of its own weight of potassium from solution, and it is certain from other observations that equilibrium had not been reached. In this case the amount of tenth normal  $\text{Na OH}$  is not exactly equivalent to the amount of iron and aluminum found gravimetrically. Other determinations show that these two ordinarily agree very closely. The amount of potassium removed from solution corresponds closely to the amount calculated from the equivalents. The difference is .0145 gram, which might be accounted for by the undetermined sodium and errors.

†Hall and Gimmingham Jour. Lon. Chem. Soc. 91. 677 (1907.)



In a different solution of potassium chloride 20 c. c. were found to contain .3046 grams of chlorine. After standing in contact with the clay for two days 20 c. c. of the final solution contained .3063 gram of chlorine. This solution carried considerable amounts of the bases already referred to, indicating that large amounts of potassium had been removed. On the other hand no chlorine had been removed from solution, but remained soluble in combination with these bases. Addition of calcium carbonate to fuller's earth, or to soils, prevents the formation of iron and aluminum salts in the extracts, even when made with strong solutions of sodium or potassium chloride.

We have treated a large number of soils with solutions of sodium and potassium chloride, and in all cases the final solutions carry bases not originally present. A certain amount of lime always goes into solution and often magnesium, iron and aluminum dissolve. In strong limestone soils as much as .2 to .35 per cent. of lime may be replaced by potassium in this way. In the latter soils very little iron or aluminum remains in the final solution. Compared with the average soils the purer clays will react with the larger amounts of the potassium chloride. This difference is due to the fact that the past conditions have been favorable for this action. The decay of organic matter and consequent liberation of these active salts have carried the action, in many soils, well along toward the end.

#### *Rate of Reaction.*

In order to show the rate at which the interchange takes place the following series of tests were made: Five 100 gram portions of fuller's earth were weighed into separate flasks. To each of these portions were added 15 grams of potassium chloride and 200 c. c. of water. These were shaken thoroly and left in the pasty condition, with occasional stirring for different periods of time, when 400 c. c. of water were added. After thoro shaking and mixing, the solutions were filtered. The rate of the reaction was followed by titrating the iron and aluminum in solution with tenth normal sodium hydroxide. This method is based on the assumption that the relative amounts of iron and aluminum in the solution remain constant while the reaction proceeds.

Table II. shows the results obtained in these observations. The first column shows the time the portions were left in a pasty condition and the others are self-explanatory:



TABLE II.

Time in Hours.	Amt. of Water in c. c.	Amt. of clay in grams.	No. c. c. of filtrate titrated.	No c. c. $\frac{N}{10}$ NaOH per 100 c. c.	Calculated total c. c. $\frac{N}{10}$ NaOH
5	600	100	100	29.2	233.6
15	600	100	100	29.3	234.4
20	600	100	100	29.3	234.4
44	600	100	100	29.1	232.8
72	600	100	100	29.	232.0
120	600	100	100	29.	232.

These data show that the changes which take place between the potassium and the iron and aluminum come about quickly. Other experiments show that a large part of the reaction takes place during the first few minutes of contact. The iron and aluminum represent the equivalent of about half of the potassium removed from solution.

A second series of experiments were made to determine the effect of increasing amounts of sodium chloride on the solubility of iron and aluminum, the variable in this case being the NaCl; other factors being kept practically constant.

In obtaining this data 50 gram portions of clay were weighed into separate flasks and varying amounts of sodium chloride NaCl were added. 100 c. c. of water were then added to each portion. These were kept stirred constantly for half an hour when 400 c. c. water were added. After thoro shaking these solutions were filtered, and the iron and aluminum titrated with N-10 NaOH, as indicated in table III.

TABLE III.

Amt. of water in c. c.	Amt. of clay in grams.	Na Cl in grams.	No. c. c. $\frac{N}{10}$ NaOH per 100 c. c. filtrate.	Total c. c. $\frac{N}{10}$ NaOH per each solution.
500	50	1	2.6	13
500	50	2	4.4	22
500	50	6	12.4	62
500	50	8	15.8	79
500	50	10	16.8	84
500	50	13	17.8	89

These data show, that other things being equal, the greater the amount of sodium chloride present, the more iron and aluminum go into solution. This holds until the reaction almost runs to an end, when an increase in the amount of sodium chloride is without effect.

These data are shown graphically in Fig. 1. The amount of sodium or potassium chloride is represented along the line A B, and the equivalent of the amount of iron and aluminum is repre-

sented along A C. The resultant for these combinations is represented along the line A. D. This, as represented, is practically a straight line along A E or until the reaction between the clay and sodium chloride has almost come to an end. Beyond E the amount of iron and aluminum in solution increases more and more slowly.

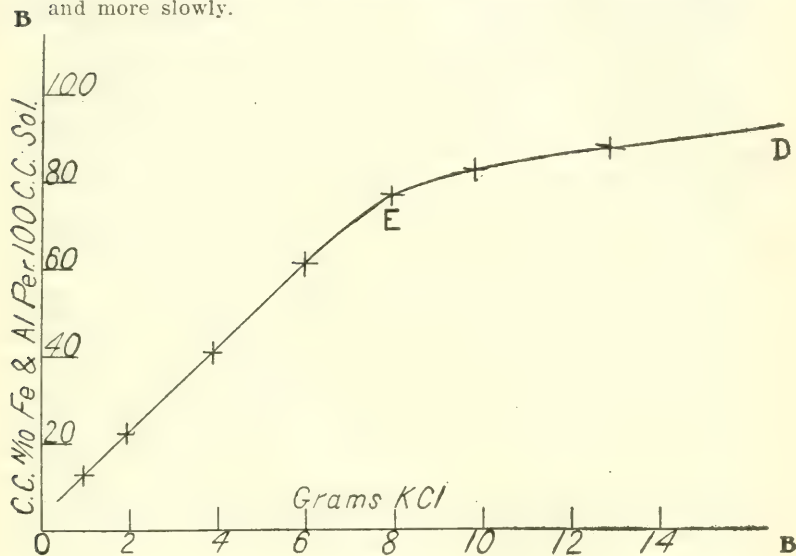


FIG. 1.

At this point the question arose as to what action the clay might have on the iron and aluminum in solution. Standard solutions of the sulphates of these bases were prepared and brought in contact with quantities of clay. After continuous stirring for several hours the solutions were filtered and the amount of iron and aluminum determined in the respective solutions. The concentration of the iron and aluminum had not been altered in the least. From these results it is evident that soils containing soluble iron or aluminum can not be left to right themselves through the action of the clay itself. The deleterious action of these soluble salts and remedies will be discussed in a succeeding paper.

In order to determine more definitely, if possible, how these reactions take place, portions of clay were treated with solutions of ammonium carbonate. In a qualitative way the ammonium carbonate undergoes decomposition with the liberation of carbon dioxide, and less amounts of ammonia. Quantitative ob-

servations show that ammonia is taken from solution, and while the original solution was alkaline to phenolphthalein, the final solution was acid to this indicator. Titrations do not show whether bicarbonate of ammonia was formed under these conditions.

*Reactions with Carbonates.*

Other portions of earth were treated with solutions of potassium carbonate. The reactions here may be easily followed. When clay first comes in contact with potassium carbonate some of the potassium is withdrawn from solution. The  $\text{CO}_2$ , which was originally combined with this potassium, is taken up by the remaining carbonate with the formation of bicarbonate. Unlike the chlorine, as already noted, the  $\text{CO}_2$  does not combine with the bases in the clay. The formation of bicarbonate continues until half of the potassium has been removed, when the bicarbonate begins to break up with the liberation of  $\text{CO}_2$ .

A solution of potassium carbonate was prepared of such a strength that when titrated 100 c. c. required 18.1 c. c. N-2 H Cl to break up the normal carbonate, as indicated by phenolphthalein and 36.2 c. c. N-2 H Cl, as indicated by methyl orange. After this solution had been in contact with the clay for a time, it was filtered off and titrated as before. 100 c. c. of this solution required 2 c. c. N-2 H Cl and 20 c. c. N-2 H Cl, with phenolphthalein and methyl orange respectively. These data indicated that practically half of the potassium had been removed from solution, and also that the  $\text{CO}_2$ , liberated by the reaction had been cared for by the remaining carbonate. Gravimetric analyses showed that the original solution contained .7092 gram of potassium while the final solution contained but .39 gram. These are the same as indicated by titration. The reaction does not stop when all of the remaining potassium is present as bicarbonate. This is seen by treating the clay with a less amount of potassium carbonate. A solution was prepared, such that 100 c. c. required 5.7 N-2 H Cl, and 11.4 c. c. N-2 H Cl, when phenolphthalein and methyl orange were used respectively. After being in contact with clay this solution was filtered and was found to be no longer alkaline to phenolphthalein and 100 c. c. required, but 3.9 c. c. N-2 H Cl with methyl orange. All of the carbonate had been changed to bicarbonate, which in turn was decomposed with the liberation of  $\text{CO}_2$ .

Almost nothing is known about the physiological effect of bicarbonates upon plant growth. Wheeler\* has applied normal

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\*Wheeler, Rhode Island Station Report, 226, 1897.

carbonate of sodium to acid soils, with good results. Since we do not know how much acid these soils contained, and have no data concerning the absorptive behavior of the soils, it is not easy to judge whether the sodium salt remaining in solution, is there as the normal carbonate, bicarbonate, or in some other combination. Because of the good effects of the applications of sodium carbonate it is safe to assume that either bicarbonate is helpful to plant growth, or what is more likely, that all of the original carbonate had gone through the bicarbonate stage, and finally broken down completely. It is certain that a normal carbonate passes through these steps while being acted upon by the soils.

The following data show conclusively how the clay behaves toward the normal and bicarbonates of sodium and potassium and ammonium carbonate.

In order to determine both the rate of the reaction between the clay and potassium carbonate, and also whether any further evidence could be had to show the nature of the reaction, the following experiments were made. A number of series of practically equivalent solutions of sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate and ammonium carbonate were prepared. Equal volumes of these solutions were added to equal quantities of fuller's earth. Titrations were made from time to time in order to follow the reactions. The different series were made up to show what effect concentration might have on the rate and amount of reaction. The results are tabulated in tables IV-XII. For convenience in comparison, the values of the different solutions are expressed in c. c. of half normal solution per 100 c. c.

TABLE IV. *Potassium Carbonate Solution.*

100 c. c. = 36 c. c. N-2 Potassium Carbonate.

Time in hours.	Grams of clay.	c. c. solution.	c. c. N-2 $K_2CO_3$ in solution.	c. c. N-2 $K_2CO_3$ removed.	c. c. N-2 $K_2CO_3$ left in sol.
2	100	600	216.	97.2	118.8
7	100	600	216.	100.8	115.2
56	100	600	216.	99.6	117.
150	100	600	216.	102.9	113.1

TABLE V.

 $K_2CO_3$  Solution. 100 c. c. = 18 c. c. N-2  $K_2CO_3$ .

Time in hours.	Grams of clay.	c. c. solution.	c. c. N-2 $K_2CO_3$ in solution.	c. c. N-2 $K_2CO_3$ Removed	c. c. N-2 $K_2CO_3$ left in sol.
2	100	600	108	61.2	46.8
20	100	600	108	63.	44.7
66	100	600	108	64.8	43.2
150	100	600	108	70.	38.0

TABLE VI.

Time in hours.	K H CO <sub>3</sub> Solution. 100 c. c.=36 c. c. N-2 K H CO <sub>3</sub> .				
	Grams of clay.	c. c. solution.	c. c. N-2 K H CO <sub>3</sub> in solution.	c. c. N-2 K <sub>2</sub> CO <sub>3</sub> removed.	c. c. N-2 K H CO <sub>3</sub> left in sol.
2	100	600	216	68.4	147.6
24	100	600	216	73.2	142.8
72	100	600	216	83.4	132.6
150	100	600	216	97.2	118.8

TABLE VII.

Time in hours.	K H CO <sub>3</sub> Solution. 100 c. c.=18 c. c. N-2 K H CO <sub>3</sub> .				
	Grams of clay.	c. c. solution.	c. c. N-2 K H CO <sub>3</sub> in solution.	c. c. N-2 K <sub>2</sub> CO <sub>3</sub> removed.	c. c. N-2 K H CO <sub>3</sub> left in sol.
2	100	600	108	55.2	52.8
25	100	600	108	56.4	51.6
72	100	600	108	64.8	43.2
150	100	600	108	69.6	38.4

TABLE VIII.

Time in hours.	Na <sub>2</sub> CO <sub>3</sub> Solution. 100 c. c.=30 c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> .				
	Grams of clay.	c. c. solution.	c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> in solution.	c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> removed.	c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> left in sol.
2	100	600	216	93	123
19	100	600	216	100.2	115.8
63	100	600	216	98	118
150	100	600	216	101	115

TABLE IX.

Time in hours.	Na <sub>2</sub> CO <sub>3</sub> Solution. 100 c. c.=18 c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> .				
	Grams of clay.	c. c. solution.	c. c. N-2 Na CO in solution.	c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> removed.	c. c. N-2 Na <sub>2</sub> CO <sub>3</sub> left in sol.
2	100	600	108	63.6	44.4
18	100	600	108	66.6	41.4
66	100	600	108	70	38
150	100	600	108	72	36

TABLE X.

Time in hours.	Na H CO <sub>3</sub> Solution. 100 c. c.=36 c. c. N-2 Na H CO <sub>3</sub> .				
	Grams of clay.	c. c. solution.	c. c. Na H CO <sub>3</sub> in solution.	c. c. Na H CO <sub>3</sub> removed.	c. c. Na H CO <sub>3</sub> left in sol.
2	100	600	216	56.4	159.6
21	100	600	216	61.2	154.8
69	100	600	216	70.4	145.6
150	100	600	216	73	143.0



TABLE XI.

Time in hours.	Na H CO <sub>3</sub> Solution. 100 c. c.=18 c. c. N-2 Na H CO <sub>3</sub>				
	Grams of clay.	c. c. solution.	c.c. Na H CO <sub>3</sub> in solution.	c. c. Na H CO <sub>3</sub> removed.	c. c. Na H CO <sub>3</sub> left in sol.
2	100	600	108	55.8	52.2
41	100	600	108	60	48
80	100	600	108	64	44
150	100	600	108	69	89

TABLE XII.

Time in hours.	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> Solution. 100 c. c.=36 c. c. N-2 (N H <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> .				
	Grams of clay	c. c. solution.	c. c. N-2 (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> in solution.	c. c. N-2 (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> removed.	c. c. N-2 (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> left in sol.
16	100	600	216	72	144
40	100	600	216	78	138
150	100	600	216	85	131

These data show conclusively that similar salts, under like conditions, are affected in the same way by the clay. These things point to a straight chemical reaction. Under like conditions the clay reacts with equivalent amounts of sodium and potassium carbonates and the corresponding bicarbonates; ammonium carbonate is broken down less rapidly than the fixed carbonates. These results are shown graphically in Fig. 2 where the amount of the carbonates reacted with is shown along O B, and the time along O A. As shown here there is a marked similarity between all of the curves. Also the greater part of the reaction takes place immediately. This is particularly true for the higher concentrations of the normal carbonates of sodium and potassium. The first parts of these curves are not shown but are coincident until they start off in the more horizontal direction.

The reactions between the clay and normal fixed carbonates are not accompanied with the evolution of CO<sub>2</sub> until after half the bases have been removed. On the other hand the evolution of CO<sub>2</sub> begins at once, when the reacting substances are Na H CO<sub>3</sub> and K H CO<sub>3</sub> and (NH<sub>4</sub>)<sub>2</sub> CO<sub>3</sub>.

#### Nitrate Reactions.

Experiments with ammonium nitrate solutions demonstrate that there is not sufficient iron and aluminum present in the final solution to account for all of the acidity as determined volumetrically. In one instance .1142 gram Al<sub>2</sub> O<sub>3</sub> was necessary to account for the acidity, while .0681 gram was found to be present. In another experiment the calculated amount of Al<sub>2</sub>O<sub>3</sub> was .113 gram, and the amount actually found was



.0381 gram. Selective action must have taken place here, with the result that the base was removed at a much greater rate. This reaction is similar to the carbonate reaction, in so much as the acid radical, at least in part, does not combine with the basic clay radicals. In the final condition free nitric acid is formed in the one case while acid carbonate is formed in the

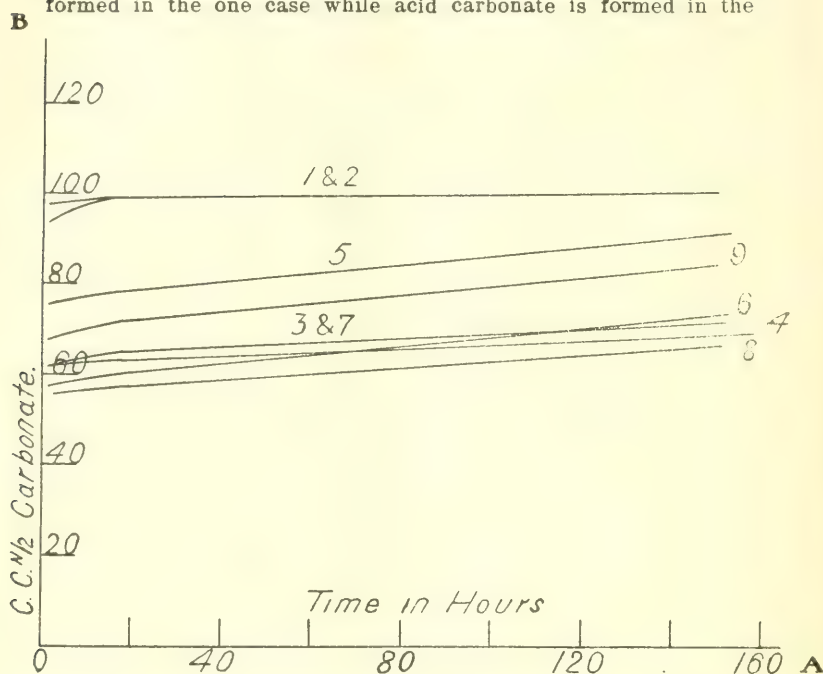


FIG. 2.

other. Potassium and sodium nitrate react quantitatively as does the chlorides of these bases.

While free nitric acid is formed when clay and ammonium nitrate react, it is not easy to see why clay and ammonium chloride should react and not form free hydrochloric acid. The conditions of the reactions are very similar, yet this difference holds for the reaction products.

Little or no selective reaction appears when sodium and potassium nitrates react with the clays.

#### *Reactions with Phosphoric Acid.*

So far we have been concerned with salts, only the bases of which were removed from solution. When solutions of potas-

sium phosphate and clay are brought together both the acid and base are rapidly removed. A solution containing .3786 gram potassium and .3 gram phosphoric acid, was shaken with 100 grams of fuller's earth and left over night. The final solution contained .05 gram potassium and .0115 gram  $P_2O_5$ . In this case about 1-15 of the original potassium and 1-20 of the  $P_2O_5$  remained in solution. A large part of both the basic and acid radicals were changed to a form insoluble in water.

A solution containing .0378 gram potassium and .03 gram  $P_2O_5$  per 100 c. c., was percolated slowly through a column of air-dried boulder clay soil, which carried a large amount of organic

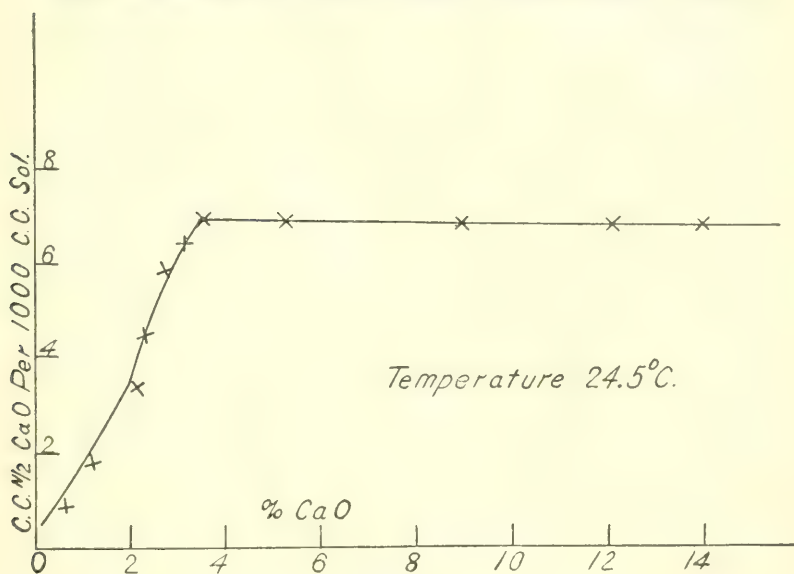


FIG. 3.

matter. The first 100 c. c. of percolate showed no color when tested for phosphoric acid and carried only .001 gram potassium. Here all the phosphoric acid and practically all of the potassium had been removed. The second 100 c. c. of percolate carried only slightly larger amounts of potassium and  $P_2O_5$ .

Qualitative examination of the final solutions from both the clay and soil showed that neither the base nor acid radical had been replaced in solution by other salts. The percolate obtained from the boulder clay was almost entirely free from mineral residue. The solutions were neutral to phenolphthalein,

methyl orange and litmus. Incidentally, when potassium chloride solutions were percolated through this same soil, the final solution carried lime, magnesium and aluminum, and was acid in reaction.

#### *Reactions with the Free Bases.*

We have already seen how like an acid the clay behaves toward the carbonates. When fuller's earth comes in contact with solutions of the free fixed alkalies and ammonia the bases are neutralized and removed from solution. The affinity seems greater for lime than for any other base and more than 13 per cent. may be cared for before the solution carries any large amount of lime.

#### *Action of Clay on the Solubility of Lime.*

A series of solutions were made with 200 c. c. water, 25 grams fuller's earth and CaO, or lime, varying from .05 to 3.5 grams. These were placed in a thermostat at 24.5°C. and stirred for two months, when equilibrium had been reached. The solutions were then analyzed for lime content. The results follow:

No. of Sample.	Grams of CaO.	Grams of clay.	c.c. water.	c. c. N-2 CaO per
				c.c. of final solution.
1	.05	0.25	200	.02
2	.15	.25	200	.1
3	.3	.25	200	.2
4	.5	.25	200	.35
5	.7	.25	200	.6
6	.8	.25	200	.68
7	1.0	.25	200	.70
8	1.5	.25	200	.66
9	2.5	.25	200	.69
10	3.0	.25	200	.71
11	3.5	.25	200	.68
12	2.0	.00	200	9.27

The CaO in solution was determined by titrating with N—2 hydrochloric acid, and the results are expressed in c. c. N—2 CaO. The data are shown graphically in figure 3. It will be noticed that the amount of CaO in solution in equilibrium with the CaO and clay is only about one-thirteenth as much as where the CaO constitutes the solid phase. If the solid phases across the range, 3 to 14 per cent., be washed with water, the concentration of the CaO in solution will remain

practically constant until the amount of CaO becomes less than 3 per cent. of the clay, when the concentration will begin to drop. The soils must behave in a similar way towards the various *inorganic* salts applied as fertilizers.

An interesting experiment may be prepared as follows for a clay free from organic matter and light in color: If organic matter is present or the clay is colored the colors may be masked. When the clay is shaken with methyl orange a part of the base of the indicator is absorbed and shows an acid reaction. If a dilute solution of caustic soda be added to the mixture and shaken thoroly, the clay will continue to react acid to the methyl orange. The addition of phenolphthalein to the supernatant solution will show this to be alkaline. The addition of too much caustic soda will destroy this acid reaction of the clay. The absorption of dyes has been noted by Parsons\*.

This is another instance where both basic and acid radicals are absorbed.

#### *Absorption of NH<sub>3</sub> and Iodine.*

To show the results of placing fuller's earth in an atmosphere of ammonia and iodine, weighed portions of clay were placed in dessicators. Into one dessicator dry ammonia gas was introduced and crystals of iodine were placed in the other. The watch glasses containing the clay were weighed from time to time and the rate of absorption noted. The weighings are shown in tables XIII. and XIV.

TABLE XIII.

Time in hours.	Amt. of clay.	Amt. of NH <sub>3</sub> in grams.	Per cent. NH <sub>3</sub> Absorbed.
0	1.2723	0	0
1-3	1.2925	.020	1.57
4 1-2	1.3038	.0315	2.49
7	1.3076	.0353	2.76
22	1.3087	.0364	2.86

These results are shown graphically in fig. 4. It is quite likely that greater precautions in drying the ammonia gas would show a less percentage absorption. When the clay is placed in the open air the ammonia is liberated quite rapidly and the weight decreases correspondingly.

The results of the absorption of iodine are given in Table XIV., and shown graphically in Figure 4.

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\*Jour. Amer. Chem. Soc. 29, 598, 1907.

TABLE XIV.

Time in hours.	Grams of Clay.	Grams Iodine Absorbed.	Per cent. Iodine Absorbed.
0	1.0154	0	0
2	1.0456	.0302	2.97
18	1.0516	.0362	3.5
42	1.0600	.0446	4.5

Considerable iodine condensed on the watch glass and the results are higher than they might have been otherwise. Like the ammonia, the iodine volatilizes readily when exposed to the air, and the original weight of the clay is soon reached.

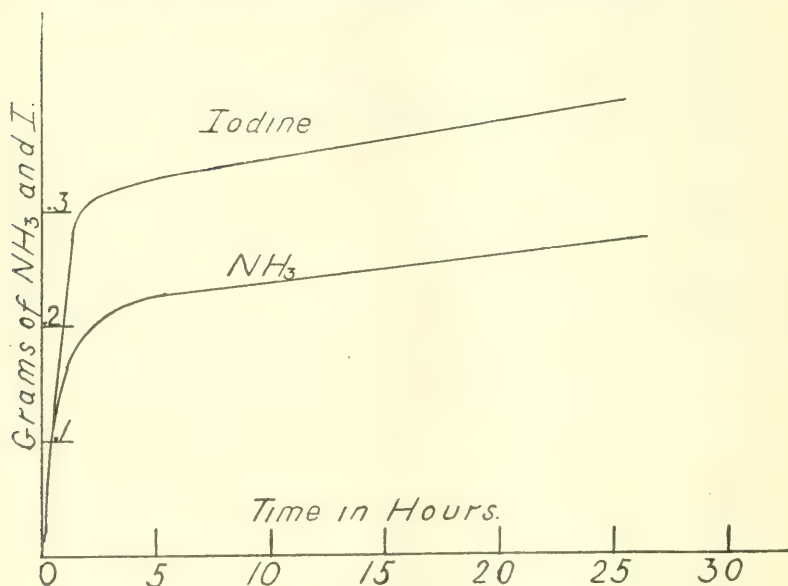


FIG. 4.

These different experiments show that the reactions go differently for the various conditions. There is no evident reason why one salt should react to form a free acid and another to form an acid salt, and another to react in a straight chemical way, while still other reactions seem to be straight absorption phenomena.

The reaction between clay and ammonium nitrate solutions resembles the reaction between carbon black and the same salt and carbon black and potassium chloride solutions. In both of

these reactions an acid solution is produced which must come about by the absorption of the bases with resulting free acids.

So far as the clay constituents of the soils are concerned, there is no reason to believe any of the present methods for determining soil acidity are of any value. On the other hand they may be and are misleading. These statements are supported also by practical observations. We have met with clay soils which change the color of litmus from blue to pink. These soils on the other hand are not acid and are benefited by applications of lime. We have taken samples of soil from immediately under lumps of lime that had been subjected to the leachings of an entire season's rains. These samples reacted to destroy the blue color of the litmus paper just as the untreated soils. In view of these observations, and at the same time bearing in mind the experiments made where only absorption or similar reactions could take place, it seems quite safe to assume that the reactions between clay soils and indicators belong to the same general category. At the same time if a soil were actually acid in character the fact should be brought out with the litmus test. While this is true, the fact that clay soils may give the acid reaction, and at the same time not be in need of lime, must not be neglected. The reddening of blue litmus must be due largely to the action of the clay rather than to the effect of acids. Ordinarily when litmus paper is left in distilled water the blue gradually fades. Indicators are formed by the reaction of an organic acid and an organic base. When these salts come in contact with clay or ordinary soils the base is absorbed or taken from solution. This results in the liberation of a free organic acid which in turn will produce an acid reaction toward the remaining undecomposed indicator. This phenomenon is best shown by stirring a washed filter paper with a solution of litmus. After a short time the solution will have a decidedly acid reaction. On the other hand the same sort of filter paper when stirred with water and filtered, yields a solution neutral to litmus. The only conclusion to be drawn is that the filter paper has removed some of the base from the indicator with the formation of free acid. The reaction between the filter paper and indicator is exactly analogous to the reaction between the clay and bicarbonate of sodium and potassium, in so far as a free acid is liberated.

#### *Mechanical Effects of Salts.*

All of the salts referred to have a decided effect upon the colloidal properties of clay. The effect of lime is most notice-



able, while the normal carbonates have the least effect. The water extract is difficult to filter and the filtrate is usually cloudy. The addition of the salts causes the fine particles to subside quickly and make clear filtrates possible.

The effect of the salts generally, is to break down the colloidal properties and to produce a more granular formation of the soil particles. On the other hand the tendency of dilute solutions of the alkalies is to increase the amount of finely divided particles of clay in suspension. The effect of free lime and magnesium is much different from the free alkalies.

The lime is one of the most effective agents in causing flocculation.

#### *Limestone Soils.*

A sample of strong limestone soil was treated in the usual way with a potassium chloride solution. Subsequent analysis showed that the lime removed from the soil equaled 0.28 per cent. of the weight of the sample of the soil taken and that about 0.36 per cent. of potassium had been added to the soil. The water extract of this soil was neutral and the residue alkaline in reaction. The potassium chloride solution extract was not acid and carried no iron and no aluminum. The soil, itself, was neither alkaline nor acid to litmus. No free carbonate of lime could be detected with hydrochloric acid. This is a good example of the reactions and conditions met with in a very productive soil. While the lime content of this soil is naturally high, it continues to take up more lime. This is shown by shaking the soil with solutions of lime water, and the amount may equal 3 or 4 per cent. of lime. It is also interesting to note the large amount of potassium which exchanges place with the calcium in the soil. This, in a small way, points out how potassium applied to such soils as fertilizers, will rapidly change over into an insoluble condition. Since in this particular soil the extract is free from soluble iron and aluminum, no deleterious effects would be expected from heavy applications of potassium salts. On the other hand applications of potassium on this soil are of little value in increasing the crop yields.

It is quite possible that some of the acid soils are not productive because of soluble iron or aluminum salts. The soils high in lime do not produce these soluble salts when treated with sodium or potassium chloride solutions. When fuller's earth is treated with potassium chloride solutions and at the same time 2 per cent. free carbonate of lime is added, no iron or aluminum remains in solution. Culture work is now in pro-

gress to determine what effect lime may have on plant growth in solutions containing iron and aluminum salts.

#### *Experiments with Muck.*

As has been stated, a number of experiments have been made on muck to determine what sort of reactions take place between organic matter in this form and solutions of KCl and other manurial salts. The muck, itself, reacted acid to litmus paper, and the concentrated extract was found likewise to be acid.

100 grams of the dry muck were shaken with 500 c. c. of a .5 per cent solution of potassium chloride and allowed to stand for 24 hours. The final solution was found to contain the equivalent of .2725 grams of potassium chloride, while .2275 grams had been removed. This solution was decidedly acid, and carried considerable quantities of lime, but no iron and aluminum. 100 c. c. of this solution carried .0492 grams of chlorine, while the calculated amount in the original solution was .0475 gram per 100 c. c.

From these data it is seen that a free acid has been produced from the muck by the action of the potassium chloride solution; potassium has been removed from solution, calcium has gone into solution; the acid radical does not enter into the reaction, or, at any rate, is not removed from solution. It is interesting to note here that the water extract of the muck does not contain any appreciable amount of acid. There is no obvious way to determine whether the potassium is entirely removed by chemical action or whether a part is removed by other phenomena. The presence of lime shows that a part is removed by chemical action. Complete analysis shows that the new bases in solution are present in quantities too small to be equivalent to all of the potassium removed.

#### *Absorption Experiments.*

When carbon black is treated with water, as one would expect, a neutral solution is obtained. On the other hand, if a solution of potassium chloride or numerous other similar salts are shaken with carbon black, decidedly acid solutions are produced. Here there can be no question but that the phenomenon is one of straight absorption, where the base is removed faster than the acid radical. In this much the carbon black and muck are similar. The obvious difference between the two, however, is that in the one instance lime goes into solution, while in the other nothing goes into solution.

*Muck Extracts.*

In order to get this organic matter free from soluble inorganic matter, a large quantity of the muck was extracted with ammonia and filtered. The soluble material was then reprecipitated with hydrochloric acid and repeatedly washed to remove as nearly all of the ammonia as possible. After drying, the mass was pulverized and analyzed. Upon analysis this yielded 97.6 per cent. volatile matter, 2.4 per cent. insoluble inorganic residue and 2 per cent. soluble residue. By distillation over caustic soda .2 per cent. ammonia was found. The larger part of the inorganic residue consisted of sand and mica. The dried extract gave an acid reaction with methyl orange. This reaction was not changed by a continued temperature of 100, and hence must be due to the organic acids and not to residual hydrochloric acid.

When 22 grams of this extract were shaken with 400 c. c. water containing .8 gram potassium chloride, at the end of four days 100 c. c. of the solution contained .1768 gram potassium chloride. This showed that the potassium had been removed equivalent to .0928 gram potassium chloride. In other words the organic matter removed about .2 per cent. of its own weight of potassium from solution. The capacity for removing lime is much greater but has not been determined quantitatively.

A quantity of the organic matter was shaken with a solution of potassium phosphate containing 300 parts  $P_2 O_5$  per million. At the end of three days no  $P_2 O_5$  had been removed from solution. The original muck, however, removed  $P_2 O_5$  in quantities from the same solution. There is a wide difference between the two portions of organic matter because of the quantities of lime and peaty material in the untreated muck. These might remove the phosphoric acid either by absorption or chemical combination. Also the extract was much more acid in character.

Hall and Gimmingham\* have shown that muck or peat will remove ammonia from solution. Dumont† has shown that soils will remove mono-calcium phosphate from solution. He decides that humus is a very important factor in the absorption. The greater the ratio between the calcium and the humus, the greater is the absorptive capacity of the soil. When the humus was removed by incineration the absorptive capacity was decidedly decreased.

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\*Jour. London Chem. Soc. 91. 677 (1907).

†Compt. Rendu Acad. Sc. 132. 443-7 (1901).

Our observations show that the muck extract, which should be very largely humus, does not remove  $P_2 O_5$  from solution. It is quite true that this extract is acid in reaction, and under these conditions we would not expect the removal of the  $P_2 O_5$ . The absorption of  $P_2 O_5$ , noted by Dumont, must have been due to the inorganic bases in the organic compounds or to the clay itself. Observations already noted show that clay will remove  $P_2 O_5$  as well as lime, from solution. It is not at all certain that Dumont's observations would show that the humus constituted the important factor in the removal of  $P_2 O_5$ . It is not certain what effect the incineration might have on the absorptive properties of the clay constituents. We have noted that incineration of some fairly pure clays reduced their absorptive capacity for bases to a marked extent. From our experiments it is very certain that the organic acids do not have to do with the removal of the phosphoric acid. We can account for the removal of this radical without bringing the organic matter into the reaction at all. Dumont has not shown that the decreased capacity of the soil for phosphates might not have been due to changes effected by heat.

#### *Soil Extracts.*

Ordinarily soil extracts carry only small quantities of organic matter. The same is true if a strong solution of sodium or potassium chloride be used. Electrolytes, other than the free alkalis, cause the precipitation of organic matter from solution. The presence of calcium and magnesium salts therefore make the amount of organic matter in the same solution necessarily low. Calcium salts and lime will completely precipitate the organic matter from a slightly ammoniacal solution. Magnesium is almost as effective in this respect. Soil extracts made by solutions of potassium chloride carry no more organic matter than the water extract, largely because of the increased amount of soluble calcium salts. We would expect the amount of soluble organic matter in limestone soils to be very low, but we have, as yet, no definite information about this interesting conjecture.

In this paper we have shown how the reactions go when clays and soils react with the manurial salts. We have divided the soil as nearly as practical into the two components, organic and inorganic, in order to reduce the work to simpler terms.

We have shown that—

1. The water extracts of most soils, drainage, pond and lake waters, are alkaline when boiled.
2. Clays and clay soils extracted with water yield alkaline solutions when free from carbon dioxide.
3. Most clay, clay soils and muck, and some other soils yield acid solutions when extracted with salt solutions.
4. Clays and soils react with potassium, sodium and ammonia in equivalent quantities when these bases are present as salts. Calcium, magnesium, iron and aluminum constitute the largest amount of reacting bases. With ammonium nitrate the base is removed more rapidly and free nitric acid is left in solution.
5. The amount of iron and aluminum in solution is equivalent to the acid content of these solutions.
6. The presence of lime and carbonate of lime prevents the formation of soluble iron and aluminum, or, what doubtless is more exact, precipitates these bases from solution.
7. The reaction between fuller's earth and the salt solutions takes place rapidly. Veitch has shown that in soils the reaction extends through a greater period of time. The amount of reacting bases depends upon the concentration of the salt solution.
8. The reaction between clays and soluble carbonates results in the removal of the bases from solution and the formation of bicarbonates or free  $\text{CO}_2$ . The amount of bases removed from solution depends upon the concentration of the carbonate solution.
9. The acid character of the solutions formed in these ways does not demand the presence of an acid to complete an explanation for their formation.
10. Where a free base is present it is simply removed from solution without forming any soluble reaction product.
11. When such salts as potassium phosphate come in contact with clays, soils, or mucks, both base and acid are rapidly removed from solution. There are no soluble bi-products formed during the reactions involved.
12. In the presence of clay the solubility of lime is greatly depressed.
13. The absorptive capacity of volatile substances is shown by the absorption of ammonia and iodine.
14. The absorptive properties of the soils is illustrated by analogy, when filter paper is allowed to react with litmus solution, or when carbon black reacts with salt solutions.



15. The general behavior of muck toward the salt solutions is not unlike that of the clay. The acid character of the salt extract of the muck is due to the absorption of the base or the liberation of free organic acid, or both. Iron and aluminum do not enter into these reactions to any marked extent.
16. The acidified alkali extract of muck will precipitate lime and small quantities of potassium from solution, but will not remove phosphoric acid from solution.
17. In a general way the tendency for clay soils, etc., is to reduce the solubility of bases with which they come in contact.
18. Where iron and aluminum are found in clay or soil extracts, the presence of soil acids is not necessary to explain the character of the solution. In muck and peaty soils the acid character of the salt extracts is largely due to increased solubility of the organic decomposition products.
19. The reactions shown in the paper explain the rapid disappearance from solution when potassium, ammonia and phosphoric acid are added to soils for fertilizers.

We have a number of soils under examination which are not acid in character, but at the same time the water extracts are not alkaline when boiled. The results on these will be found in a subsequent paper.

#### THE EFFECT OF SOILS ON THE SOLUBILITY OF POTASSIUM.

Percolation experiments made here and elsewhere, show that soils change the potassium of soluble salts into an insoluble form. These laboratory experiments are confirmed in a practical way by field observations.

In the spring of 1907 potassium was applied as a top dressing to grass plots on a stiff, clay soil at the rate of 30 and 60 pounds per acre. Generous rainfalls followed the applications of potassium, and conditions, generally, were favorable for a good growth of the grasses.

Eight weeks after the application of the potassium, samples of the soils were taken from the different potassium plots and the nothing, or check plots. These samples were extracted with water in the usual way for the determination of the soluble potassium. A comparison of the results showed that the extracts from the potassium plot soils carried no more potassium than the extracts from the check plots. The plots were ar-



ranged so that every potassium plot came beside a nothing, or check plot. The results follow below:

Pounds of Potassium added per acre.	Parts of K in extract per million pts. of soil.
00	9.4
30	9.0
30	9.9
00	9.3
00	10.2
60	9.7
60	11.4
00	10.6

These plots were on a very uniform lot of soil and all of the samples were taken at the same time. The first four determinations represent one series, while the second four represent a second series. The two different series were located in different parts of the field. All of the added potassium had been converted into an insoluble form during the time of eight weeks.

In addition to the observations made on the grass plots some data have been taken from a potato field. In this case the soil was a light clay loam with good drainage.

The potatoes were heavily fertilized with potassium salts at the time of planting. The fertilizer was placed in the rows, immediately over the seed, at planting time or about the first of May. The soil in the rows was not disturbed until digging time, the first of September. At this time care was taken not to scatter the soil, but to dig a trench about 12 inches wide, and as deep as the potatoes, and confine the soil to this as much as possible. The soil for a distance of several feet in each of three rows, was thoroughly mixed and sampled. In many places there were evidences of undecomposed fertilizer, which proved to consist largely of mould. The heavy growth of tops had, however, prevented a large part of the rainfall from percolating directly down through the soil immediately beneath. This fact, as well as the lightness of the soil, would tend to prevent the change of soluble salts into an insoluble form. A collective sample of soil was taken from midway between the rows for check purposes.

These samples were extracted with water in the usual way and the soluble potassium determined. The results follows:

No. of Samples.	Parts soluble potassium per million parts dry soil.
1 from row.	21
2 from row.	30
3 from row.	23
4 midway between rows.	7

It is not known just how much potassium had been applied, but these results show that a considerable amount remained soluble at this time. The natural amount in solution as represented by sample 4, is only 1-3 or 1-4 the amount found in the rows. However, the check sample is hardly representative because the upper and best soil had been removed and heaped toward the growing vines, otherwise we would expect a higher value for the potassium. From the data available between 90 and 120 pounds of potassium per acre had been applied at planting time. Either amount distributed immediately in the row should show more soluble potassium than was found, had a large part of it not been converted into an insoluble form.

The different types of soil, the different methods of distribution of rainfall and the different quantities of potassium represent the obvious differences between the two conditions represented. All of these would tend to keep the potassium in a soluble condition for a longer period in the potato field.

The first of August, 1907, samples of soil were selected to represent three soil types. One was taken to represent a strong clay soil, and was largely boulder clay with about 4 per cent. organic matter, and practically no sand. A second sample was taken to represent a clay loam, with about 50 per cent. clay and 3-4 per cent. organic matter. The third sample was a light, sandy loam with about 30 per cent. clay and 3-4 per cent. organic matter. The sub-soil of the last two types is largely clay.

The soils were air-dried and then 200 c. c. water added per kilogram of soil. Different known quantities of potassium chloride were added to each of the samples. The potassium chloride was added in solution in order to secure a more uniform distribution of the potassium. After the addition of the potassium and water the mixture was stirred thoroly and set away in sealed Mason jars for 14 weeks. At the end of this period 120 grams of the mixture was extracted with water, and the amount of soluble potassium in solution determined. The results of these experiments follow below. The amount of potassium chloride added per kilogram of soil is given in the first column, under the different types of soil; the amount

of potassium chloride recovered is given in the second column, and the amount of potassium chloride rendered insoluble is given in the third column. The amount of dry soil was the same for each experiment.

Grams of Potassium Chloride added.	Grams of Potassium Chloride recovered.	Grams of Potassium Chloride made insoluble.
Clay Soil.		
1.50	.520	.980
1.00	.435	.565
.5	.125	.375
.25	.075	.175
Sandy clay soil.		
1.50	.885	.615
1.00	.555	.440
.5	.275	.225
.25	.130	.120
Sandy loam.		
1.50	.990	.510
1.00	.621	.379
.5	.300	.200
.25	.135	.115

These data show how much of the potassium has been changed to an insoluble condition. They also show that the clay soil can, under some conditions, remove from a soluble form about twice as much potassium as the light loam soil. For these three particular types of soils the amount of potassium affected is dependent on the amount of clay present. Further experiments show that after a lapse of more time, less of the potassium can be recovered than at the end of the first period. The conditions are such that circulation of moisture does not assist greatly in the action. Under natural conditions the rainfall and consequent movement of the water will bring these changes about more quickly, and more effectively, as already shown in the grass plots. A succession of light showers would, doubtless, remove very large quantities of soluble potassium in a comparatively short time.

The potassium removed is not carried down into the sub-soil, but enters into combination in place with the soil particles. This is particularly true for the clay soils and to a less extent for the light loams. In a light, sandy soil a large amount of soluble salts would be carried down into the sub-soil by heavy rainfalls. This is readily seen from the amount of soluble potassium left in the potato field.

The percolation experiments already referred to show better than any other way how the reactions go between soils and potassium. In order to get data on this the following experi-

ments were carried on. Columns of dry soil about 14 inches high, were prepared in glass tubes. Solutions of potassium chloride, with 200 parts of potassium per million, were percolated through these soils at the rate of about 60 c. c., per 24 hours. The percolate was collected and analyzed for potassium content.

The soils used in this experiment were of the same type as were used in the jar tests, i. e., clay, sandy clay and sandy loam, the analyses of only the first 200 c. c. percolate are given here. We see from the data at once that practically all of the potassium has been removed from the solution.

Parts K per million in the first 200c.c. percolate.	Sandy clay.	Clay.	Sandy loam.
	19	16	24

In other experiments where the solution had percolated through a longer column of soil, the final solution contained no more potassium than was the case when distilled water was percolated through a column of the same soil, or about 9 parts per million. However, all of the percolates carried lime, magnesium, etc., in quantities equivalent to the potassium removed. From the percolation experiments it is evident that, at most, two or three good rains would be enough to change ordinary applications of potassium into an insoluble form.

All of these facts show how quickly and effectively clays remove potassium from solutions or change it over into an insoluble form. This is an argument in favor of light and numerous applications of potassium for either chemical or mechanical effects.

It has been our purpose to establish the fact that the soils do change the solubility of potassium, both in the laboratory and in the field. The rate at which these changes take place has been shown to be very rapid under favorable conditions; also it has been demonstrated that large quantities of potassium may be acted upon.

#### THE EFFECT OF SOME COMMON CHEMICAL FERTILIZERS ON THE SOLUBILITY OF THE POTASSIUM OF SOILS AND SOIL MINERALS.

#### SOME NOTES ON THE SOLUBILITY OF POTASSIUM OF SOILS AND SOIL MINERALS.

##### FELDSPARS.

In our soils a large part of the natural potash is carried by the feldspathic minerals. The potassium in these minerals becomes available to plant needs through their solubility and de-

composition. Both of these processes are conducted under natural conditions with such a degree of nicety and economy, that the supply not only of potassium but other mineral essentials of plant growth, are conserved for the sustenance of succeeding crops. The conditions under which these economies are effected are now both known and understood. The natural solubility of the minerals is low. The solubility is accompanied by decomposition with the formation of clay as a by-product. In the process of solution and decomposition food is furnished for plant growth. An economic function of the clay by-products, among other things, is the conservation of the soluble plant food. This is made possible by their remarkable absorptive capacity for the plant food constituents in the soil solutions. The low solubility of the soil minerals, together with the absorptive properties of the clays, accounts for the small quantities of mineral residue found in most drainage waters, and also in water extract of most soils.\*

The literature is not clear in stating how the soil minerals dissolve. Theoretically there should be little difference between the concentrations of solutions in equilibrium with soils composed of similar minerals. What effect organic matter, which always carries more or less mineral substance, can have on displacing these concentrations, while probably not great, is not definitely known. Also the absorptive and adsorptive properties enter in as other disturbing factors. These cause some variations in the amount of water soluble salts that can be washed from different soils.

At present there are no data to show at what rate readjustment takes place when water is added to soil solutions already under equilibrium conditions. If readjustment takes place quickly, the fact should be easily demonstrated by extracting with water two or more samples of the same soil which have been allowed to stand for a few days in contact with different amounts of moisture, other things being equal, and assuming that equilibrium is reached at a fairly rapid rate there should be a difference in the amounts of total solids obtained from equal portions of the respective water extracts. Such appears to be a fact. Experiments of this sort show that when samples of the same soil are kept under constant but different moisture conditions, the largest amounts of soluble matter are obtained from the water extracts of the soils maintained at the higher moisture content. Two samples of the same soil were

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\*See Morse and Curry. This volume, page 274.



made to have moisture contents of 27 per cent. and 34 per cent., and kept in this condition for four months at the end of this period 125 grams of each were extracted with water to equal a total of 500 c.c. The amount of water supposed to be in equilibrium with the soils before extracting amounted to 34 c. c. in one and 41.6 c. c. in the other, or a difference of a little more than 22 per cent. The extracted solid matter from the soil, with the lower moisture content, amounted to .0515 gram, of which .0350 gram was volatile. The other sample yielded .0600 gram of solid matter, of which .0405 gram was volatile. In these examples the amount of material extracted was almost directly proportional to the moisture content of the soils. This ratio holds for both the organic and inorganic residues. The generality of these relations is substantiated by the following experiments:

Five types of soil, varying from a light sandy loam to a boulder clay, were treated with varying amounts of water. After thoro mixing each portion was transferred to a glass jar and sealed and kept in this condition for 80 days. At the end of this time an equivalent of 100 grams of dry soil was weighed from each jar and water added to bring the total amount up to 500 c.c.. From this point the procedure is the same as outlined in Bulletin 32 of the Bureau of Soils. The total residue was determined by weighing the residue obtained by evaporation on the water bath. The salts obtained in this way are more or less hygroscopic and difficult to bring to constant weight. The mineral residue was determined by heating the total residue over a flame to dull redness. By using platinum dishes the carbon is easily volatilized. The data follow:

TABLE 1. *Weight of Total Residue in Grams Per 100 c.c. Soil Extract.*

c.c. Water per 100 gr. soil	Sandy Loam	Stony Loam	Stony Clay Loam	Silt	Sandy Clay	Clay
10	.0146	.0054	.0123	.0118	.0177	.0160
20	.0082	.0060	.0090	.0072	.0231	.0172
30	.0099	.0054	.0300	.0061	.0211	.0294
40	.0088	.0130	.0400	.0169	.0214	.0314
50	.....	.0154	.....	.0170	.....	.0397

The values for the inorganic matter are shown in Table 2:



TABLE 2. *Weight of Total Residue in Grams Per 100 c.c. Soil Extract.*

cc Water per 100 grs. soil.	Sandy loam.	Stony loam.	Stony clay loam.	Silt.	Sandy clay.	Clay.
10	.0039	.0023	.0036	.0040	.0045	.0052
20	.0031	.0027	.0038	.0031	.0055	.0046
30	.0049	.0028	.0060	.0037	.0058	.0066
40	.0050	.0074	.0077	.0058	.0067	.0086
50	....	.0079	....	.0063	....	.0103

These results do not point to the existence of any definite ratio between the amount of moisture in the soils and the amount of water soluble salts. However, where the percentage of moisture is greatest the amount of water soluble inorganic matter is greatest. In any one of the given soils the amount of soluble matter increases, but not proportionately, with the moisture content. The various soils differ considerably in amounts of soluble salts found in their extracts. Where the moisture contents exceeded 40 or 50 per cent. the results were more of less erratic and in some instances are not reported. At present we have no satisfactory explanation for this.

In order to show that in 80 days approximate equilibrium had been reached, the following data are given in Table 3. In these experiments the amount of moisture was kept constant at 40 c.c. per 100 grams of dry soil, the time factor being variable. These results were obtained by leaving the soils in contact with the same amount of moisture for different periods of time and extracting in the same way as already indicated. While these results are only relative, at the same time it is quite reasonable to assume that they represent the changes.

TABLE 3. *Weight of Total Residue in Grams Per 100 c.c. Extract.*

Time	Sandy loam.	Stony loam.	Silt.	Sandy clay.	Clay soil.
20 min. ....	.0047	.0058	.0052	.0072	
3 hrs. ....	.0049	.0084	.0064	.0095	.0080
6 hrs. ....	.0069	.0091	.0082	.0107	.0118
1 day ....	.0092	.0090	.0088	.0111	
4 days ....	.0099	.0116	.0134	.0111	.0123
80 days ....	.0088	.0130	.0400	.0214	.0314

The inorganic residues for these same solutions follow in Table 4.

TABLE 4. *Weight of Mineral Residue in Grams Per 100 c.c. Extract.*

Time.	Sandy loam.	Stony loam.	Silt.	Sandy clay.	Clay soil.
20 min. ....	.0016	.0013	.0012	.0018	.0023
3 hrs. ....	.0013	.0014	.0023	.0042	.0038
6 hrs. ....	.0027	.0038	.0035	.0046	.0052
1 day ....	.0038	.0035	.0024	.0037	.0059
4 days ....	.0032	.0047	.0056	.0049	.0056
80 days ....	.0037	.0074	.0058	.0067	.0986

These data, particularly the inorganic results, indicate that the first set of data was taken after equilibrium had been established between the soil and moisture. The tables show also that equilibrium is established fairly rapidly. A relatively large part of the salts go into solution during the first few minutes of contact between the soil and moisture. The actual rate at which solution continues is also shown for these different soils. The clay formed by decomposition of the feldspathic minerals, however, introduces factors met with under all ordinary soil conditions, which take place when the moisture content of a soil is increased. By decreasing the amount of soil moisture before extraction, the amount of soluble salts will have decreased. This is due either to the absorptive properties of the clay in the soils or to recrystallization of the salts into an insoluble mineral.

The feldspar minerals do not exhibit any marked absorptive capacity for soluble bases. For this reason they are valuable only as a source of potassium. The slowness alone with which these minerals dissolve insures an almost inexhaustible supply of potassium, while the absorptive action of the clays and organic matter prevent the removal of the dissolved potassium by again rendering it insoluble.

There have been a number of theories advanced concerning the solubility of soil minerals. Two of these may be assumed to represent these differences fairly well. \*Cushman maintains that the feldspar dissolves slowly in the soils because continued exposure of the surfaces of the finely divided particles to the solvent action of the soil solutions have caused the formation of protective surface films. These films do not break down easily and the minerals dissolve less rapidly. This theory is supported by the fact that the regrinding of feldspars that have been subjected to the solvent action of water causes a great increase in the rate of solubility. When the surfaces

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\*Bulletin 32, Dept. of Agriculture, Bureau of Chemistry.

are again filmed over new surfaces may again be produced by regrinding and with a continued high rate of solubility. According to this idea the soil particles due to the continued action of water present only old surfaces, and because of this solution takes place slowly.

Again there is another \* theory that the soil minerals are continually dissolving or forming with a tendency toward equilibrium solutions. Under these conditions, with equilibrium approximately established, an increase in the moisture content would cause further solution, while on the other hand a decrease in the amount of water would cause the formation of new minerals or insoluble salts. While the formation of these new minerals has not been definitely established, the idea is in perfect keeping with our present knowledge of equilibrium conditions. When studied under the microscope the soil minerals have sharp, definite, crystal edges. This must be due to recrystallizing processes, otherwise the edges would soon become rounded and the outlines of the crystals undergo marked changes. It is known that salts added to soils as fertilizers, soon lose their identity. Careful work shows that the requirements of growing crops are not the cause of these changes. The bases of these salts go either to form new minerals or are incorporated into the clay as constituents of solid solutions or absorption products.

Numerous references are made, in agricultural literature, to the beneficial effects obtained when soils are treated with applications of lime. It is generally conceded that among other things the action of the lime tends to make the natural potassium more soluble and more available for plant growth. While this conclusion has long been in evidence, no data other than indirectly, have been produced to show that it is necessarily true. In practice other applications are made to the soil in order to produce better plant growth. Nitrogen is supplied in the form of salts, as well as in organic matter. Ordinarily, applications of phosphoric acid are accompanied with gypsum. From this it is at once evident that the application of a complete fertilizer to a soil might be a very complex matter in effect.

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\*Bulletin 30, Dept. Agr., Bur. of Chemistry.

It is the purpose of this paper to show what effect lime, gypsum and the common manurial salts applied separately, produce on the potassium content of the feldspars. The experiments have been conducted on the feldspars because, as already stated, they are the natural source of potassium, and in this way the undesirable effects of clay and organic matter are avoided. Also, greater effects should be obtained where feldspar alone is treated because of the larger amount of potassium present.

The experiments were conducted as follows: Usually 25 grams of finely ground feldspar, 180 c.c. water and known amounts of lime, gypsum, and the various salts, were placed in glass-stoppered bottles. These mixtures were placed in a thermostat at 24.5 degrees C. and stirred for 7 weeks. At the end of this time the bottles were removed from the shaft and placed on the bottom of the thermostat. After a few days the supernatant solution was pipetted off for analysis. In some combinations the supernatant solutions were not clear and in these cases the solutions were passed through a filter.

In the beginning a number of determinations were made to ascertain the rate at which the feldspar goes into solution. The results of these have not been at all satisfactory because of the difficulty encountered in obtaining uniformly clear solutions. The solutions were freed from the finely divided, suspended feldspar particles by means of a porcelain clay filter. In every case the first portion of the filtrate was discarded. Charges of 30 grams of feldspar with 180 c.c. of water were placed in glass-stoppered bottles and stirred at a temperature of 24.5 degrees C. The bottles were removed at stated intervals and the solution filtered. 100 c.c. of the filtrate was evaporated to dryness in a weighed platinum dish ignited to dull redness to remove water and any traces of organic matter, cooled and weighed. The average results are shown in Table II. The time is given in the first column and the number of milligrams per 100 c.c. solution is given in the second column. Distilled water was used as solvent.

Time in days.	Milligrams residue per 100 c. c. sol.	Time in days.	Milligrams residue per 100 c. c. solution.
1-24	120	16	197
1	160	24	200
2	170	30	202
4	175	36	201
8	185	50	205

The data are plotted in Fig. 5 to show the relation of the time factor to the amount of soluble residue. At first the curve is steep but gradually approaches a horizontal direction after about 20 days. The largest amount of solution takes place during the first few hours. As the solution continues the rate decreases slowly as it approximates zero or as equilibrium conditions are reached. From these experiments it is evident that there is a limit to the concentration of mineral solutions. While this is true, it is also shown that a readjustment ought to take place rapidly to correspond to any change in the water content.

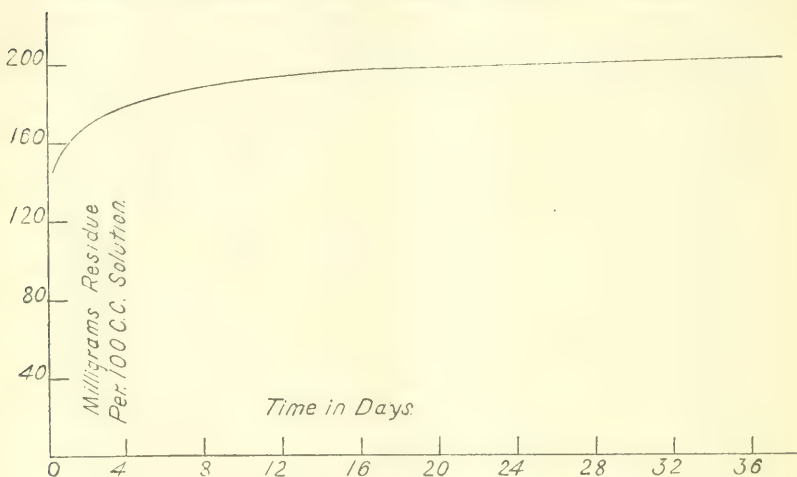


FIG. 5.

Other experiments were conducted as follows: Thirty grams of finely ground feldspar, 180 c.c. water and known amounts of lime, gypsum, sodium-nitrate, ammonia-sulphate, sodium-carbonate and di-sodium phosphate were placed in a thermostat at 24.5 degrees C., and stirred for 7 weeks. At the end of this time the bottles were removed from the stirring gear and placed on the bottom of the thermostat. After a few days the supernatant solution was pipetted off for analysis. In some combinations the supernatant solutions were not clear. In these cases the supernatant solutions were passed through a filter.

It is not certain that equilibrium had in every case been established, but a very close approximation had been reached. This is not, however, of importance since the direction rather than the magnitude of the reaction, is the point in question. The solutions were analyzed for soluble potassium as follows: 100



c. c. of the solution were concentrated to about half the volume, when enough ammoniacal ammonium oxalate was added to precipitate all of the calcium, aluminum, etc. After the removal of the precipitate the solution was evaporated to dryness in the presence of sulfuric acid. The excess of acid and the ammonia was removed at this point by heating to dull redness. The potassium was then precipitated by an excess of platinic chloride solution. After thorough washing with alcohol to remove the excess of platinic chloride and soluble chloroplatinates, the precipitate, together with the filter, was transferred to a weighed platinum crucible and reduced by ignition. After slight acidulation, the residue was thoroughly washed with hot water and weighed as metallic platinum.

The potassium involved in the reaction was calculated from the amount of metallic platinum.

Table I contains the data for these experiments. In every case 25 grams of finely ground feldspar was stirred with 100 c.c. of water. Other salts were added in different amounts. Time 7 weeks.

TABLE 5.

Reagent added	Amt. of reagent added in grams.	Amt. of K liberated in grams.	Average.	Amt. of K liberated by action of reagent
0	0	.0053	.0056	0
0	0	.0058		0
0	0	.0059		0
CaO	1	.0102	.0126	.0070
CaO	2	.0130		
CaO	2	.0140		
CaSO <sub>4</sub>	1	.0063	.0076	.0020
CaSO <sub>4</sub>	2	.0067		
CaSO <sub>4</sub>	3	.0068		
NaNO <sub>3</sub>	1	.0101	.0100	.0044
NaNO <sub>3</sub>	2	.0100		
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	1	.0100	.0105	.0049
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	2	.0110		
Na <sub>2</sub> CO <sub>3</sub>	1	.0080	.0085	.0029
Na <sub>2</sub> CO <sub>3</sub>	2	.0091		
Na <sub>2</sub> HPO <sub>4</sub>	1	.0090	.0088	.0032
Na <sub>2</sub> HPO <sub>4</sub>	2	.0087		

All of the solutions except the checks and those containing sodium phosphate and sodium carbonate filtered readily. The finely divided feldspar particles were separated from the other solutions by filtering through porcelain clay filters.

The data show that so far as the feldspar is concerned, the general effect of the presence of electrolytes is to hasten or increase the rate of solution of the potassium. So far as could be determined there was little or no tendency for the undissolved feldspar to remove any of the soluble potassium from solution.



Lime causes more potassium to go into solution than does any of the other combinations tried. This is probably not because of the alkaline character of the solution, otherwise an equal amount of potassium would have dissolved where  $\text{Na}_2\text{CO}_3$  was substituted for the lime. Also there is a marked difference between the action of lime and gypsum. It has been generally supposed that gypsum is about as valuable as lime when applied to soils.

The last column in Table 1 shows the amount of potassium in excess over the average amount found in the solution where water and feldspar had been stirred together. These differences are credited to the action of the various agents which were added to the solutions. The excess, as seen, varies from 35.7 per cent. to 125 per cent., with lime highest and gypsum lowest. The general effect of all of the commonly used manurial salts on the feldspars in the soils tends to increase the available potassium, or, at any rate, to make the potassium dissolve faster.

It has been a time-honored custom to speak of the interaction between lime and the so-called soil zeolytes. Zeolytes are represented by the partially decomposed minerals where the potassium is easily replaced by lime and other similar bases.

In order to determine the rapidity with which these changes take place, we have treated a zeolyte with water, lime and gypsum. A zeolyte, commonly known as apophyllite, was reduced to a fine powder by grinding. Portions of 30 grams each were weighed into glass-stoppered bottles. To one portion was added 100 c.c. water, to another 100 c.c. water and 1 gram  $\text{CaO}$ , and to the third 100 c.c. water and 1 gram  $\text{CaSO}_4$ . These were placed in a thermostat at 24.5 degrees C, and stirred for 9 weeks. The series was run in triplicate.

The average of the results are shown in Table 6:

TABLE 6.

Reagent added.	Amount of K in solution in grams.	Amount of K in grams dissolved by action of lime and gypsum.
H <sub>2</sub> O	.0029	.0000
$\text{CaSO}_4$	.0025	.0004
$\text{CaO}$	.0031	.0002

The effect of the lime and gypsum seems to be negligible on the apophyllite. The amount of potassium liberated in the nine weeks is very slight. The original zeolyte contained 2.3 per cent. potassium, and less than .5 of one percent of the total

amount was dissolved. Since the differences between the amounts of potassium obtained from the various solutions varies less than .3 of one milligram from the average, all must be of the same magnitude.

Before making the observations on the feldspar a number of experiments were made to determine the action of lime and gypsum on soils. These experiments have been carried on both in the field and in the laboratory.

Samples of soil were collected from check plots and from plots that had been treated with heavy applications of both lime and gypsum. In the latter samples the soil was taken from immediately under the spots where the lime was still in evidence. The samples were taken two years after the application of the lime. The soil was of the strong clay variety and carried about 3 per cent. potassium oxide. After thorough mixing the samples were shaken with water in the usual way, and the amount of potassium in the extract determined in parts per million of the dry soil. The results on four samples follow:

TABLE 7. *Parts Potassium per Mill. of Dry Soil.*

Sample No.	Limed Soil.	Unlimed Soil.
1	12	13
2	9	8
3	11	11
4	12	10
Average	11	10.5

Practically there is no difference in the amounts of potassium washed from these soils whether lime or no lime had been applied. However, the amount of inorganic residue in the extracts of the limed soils was much the greater. The lime and gypsum had affected the mechanical condition of the soil in so much as the untreated portions were less friable and showed a greater tendency to puddle. At the same time no difference has been noted in the yield of grass on the different plots up to and including the fourth mowing. In the meantime the soil had been subjected to the action of the lime and the freezing and thawing of two winters.

Samples of a clay and sandy clay soil were treated with lime at the rate of 1 and 2 grams per 100 grams of soil, and stirred constantly for 5 weeks with 500 c.c. of water. At the end of this time the solutions were filtered and the amount of potassium determined in each solution. These results follow:

TABLE 8. *Parts Potassium per Million of Dry Soil.*

No. of Sample.	Limed Clay.	Unlimed Clay.	Sandy Clay limed.	Sandy Clay not limed.
1	40	44	36	42
2	48	39	42	38
3	39	44	36	40
4	45	42	38	38
Average	43	42	38	39.5

These results are typical of a number of observations. In some instances there is more soluble potassium in the unlimed samples, while in other instances the limed samples yield more potassium. The averages are so close together that no distinction can safely be made.

Another set of experiments have been made to determine what effect freezing and thawing would have on limed and unlimed soils. Here again no difference could be found except in the mechanical condition of the various soils. The different samples were treated with lime and together with the checks subjected to changes of temperature from 10 degrees to 20 degrees Farenheit. After a number of successive freezes and thaws, the samples were extracted with water and the soluble potassium determined. The results follow:

Sample No.	No Lime—Parts K per ml. dry soil.	Lime—Parts K per ml. dry soil.
1	19.4	19.8
2	18.4	20
3	22.9	23
4	22.	22
5	22.	22
6	23.	20

The data for the gypsum and soils have not been given but are of the same general character as those given for the lime.

In a general way the action of lime and the calcium salts has the same effect on the solubility of potassium, both in the soils and the zeolytes. On the feldspar mineral the effect of lime is to increase the solubility of the potassium. There is at once an apparent discrepancy between these conclusions. It was at once evident that some explanation had to be made for this. Experiments with clay had shown that the clay would remove potassium from a solution of potassium chloride, or any other salt of this base. With this in view we added together 25 grams of clay, and 25 grams of the feldspar, lime, and 180 c. c. of water. These, with checks, were placed in a thermostat at 24.5°C, and stirred for 7 weeks. At the end of this time the solutions were examined for potassium. The results follow:

Bottle.	Grams Feldspar.	Grams Clay.	Grams CaO.	c. c. Water.	Soluble Potas- sium in grams.
1	0	25	0.0	180	.0012
2	0	25	2.	180	.0009
3	30	25	1.	180	.0060
4	30	25	2.	180	.0052
5	30	0	0	180	.0056
6	30	0	0	180	.0060
7	30	0	1	180	.0126
8	30	0	2	180	.0132

The action of the clay is definitely shown here. The presence of the clay has reduced the amount of potassium in solution more than 50 per cent. The lime, clay, feldspar solutions carry no more potassium than the feldspar water solutions. The clay has changed the conditions of the reaction from the reaction of lime with a mineral, to the reaction of lime with a soil. There is little doubt but what the lime reacts with as much potassium in the one case as in the other, but where clay is present the solubility of the potassium is decreased.

In this connection the solubility of lime in equilibrium with water, and in equilibrium with water and clay, is of interest. At 24.5 degrees C, 100 c.c. of water will carry about 0.129 gram CaO. When clay is added to this system the solubility of the CaO is depressed, and at 24.5 degrees C, 100 c.c. of the solution carries only .009 gram CaO, or about one-thirteenth of the amount where no clay is present. The depression in the solubility of the potassium in the feldspar solutions, caused by the clay, no doubt, is analogous to the depression in the solubility of the lime where clay is present.

An ordinary soil will cause a depression in the solubility of CaO. For an example we obtained a sample of strong clay, limestone soil. This was taken where the limestone ledge lay but a few feet below the surface. The water extract of this soil, when heated, reacted strongly alkaline. On the other hand 100 grams of this soil rapidly decreased the CaO content of a solution from 1.3 to .45 gram. In other words, the CaO content of the solution had been decreased from .119 to .03 gram per 100 c. c. Contact for a longer time would depress this solubility still further.

Summing it up, it may be stated:

In general, the amount of water soluble salts in a given soil is dependent on the amount of soil moisture, and the time during which the soil and moisture have been in contact, providing, of course, that the time has not been sufficient to establish

equilibrium. Equilibrium having been established, the amount of solute depends on the amount of moisture.

The rate at which the feldspar dissolves is fairly rapid until approximate equilibrium is established.

The rate at which the soil minerals dissolve decreases as equilibrium is approached.

The effect of these solvents is to increase the amount of soluble potassium in the feldspars.

Time produces the most pronounced results.

These solvents do not increase the amount of water soluble potassium in soils.

We have not been able to replace the potassium in zeolytes, (apophyllite), by stirring the ground mineral with lime.

The results are different, depending on whether soil or mineral is subjected to the action of these solvents. The difference is due to the presence of clay in the soils.

The action of the clay is not dependent on temperature.

The addition of clay to a solution of CaO depresses the solubility of the CaO. This action, apparently is analogous to the depression of the solubility of potassium.

From a laboratory point of view, the effects of lime on a soil are more mechanical than chemical. The mechanical effects are easily noted. The chemical effects cannot be followed.

In a practical way the mechanical effects due to the action of lime may or may not produce greater crop yields. At present we cannot make predictions either way with any great certainty.

Neither field nor laboratory work has been able to establish any relation between applications of lime to soil and the amount of water soluble potassium in the soil moisture.

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## DEPARTMENT OF AGRICULTURE.

FRED W. TAYLOR.

### I. ORGANIZATION AND EQUIPMENT.

The only important change in the organization of this department since the last report, was its division July 1st, 1908, into the two departments of Agronomy and Animal Husbandry. This division has been made in nearly all similar institutions, and seemed justified here on the ground that the work and interests of the two departments were essentially different and not closely allied. It is believed that the change will add to the



efficiency of both departments, since there can be a greater concentration of work and energy along the respective lines.

Prof. E. L. Shaw, who had been assistant in agriculture, and who had direct charge of the animal husbandry work since Sept., 1903, resigned his position July 1st, 1907, to accept a similar one with the Bureau of Animal Industry at Washington, D. C. On July 1st, 1907, Mr. Jasper F. Eastman, (Mass. Agr'l College '07) was secured as assistant in Agronomy and has had charge of the field and laboratory work in that line. Several changes have been made during the past two years in the position of herdsman, but on April 1st of this year we were fortunate in securing for that position Mr. J. C. McNutt, (Ohio State Univ. '07), who has had much training in the judging and handling of livestock. Mr. Geo. S. Ham, who has capably filled the position of farm foreman for the past three years, has tendered his resignation, to take effect November 1st.

In the matter of equipment, the most important additions have been the erection of a sheep barn and the purchase of sheep for the sheep breeding work, which is now being prosecuted under the provisions of the Adams Fund. For the work in grain production a self-binder, a thresher and a fanning mill have recently been purchased.

## II. AGRONOMY.

The work of the Agricultural Department naturally falls under two heads; i. e., agronomy and animal husbandry. The agronomy work having to do with soils, the production of field crops, and the use of fertilizers and manures, is reported under the following heads: 1. Soil Tests. 2. Corn Breeding. 3. Grain Crops. 4. Fertilization of Grass Land, 5. Forage Crops, 6. Seed Testing, 7. Co-operative Work.

### 1. SOIL TESTING.

In order to try the practicability of the so-called "wire basket" method of determining the manurial requirements of soils, a series of tests was conducted in the laboratory and green-houses last winter. The object of these tests was two-fold;—first, to determine the maximum differences, both in the transpiration and green weight of the plants with and without manurial elements; second, to determine the closeness of agreement between the results obtained from the basket method and those obtained from field plots on the same type of soil.

Four types of soil were taken from various fields of the college farm, i. e., stony loam, sandy loam, clay loam and clay. In



the treatment and handling of the baskets, soils, fertilizers and plants, the detailed directions given by the Bureau of Soils in Circular No. 18 were carefully followed. The plants used were wheat seedlings and were allowed to grow from 30 to 40 days, there being four duplicates of each treatment of the soil. The manurial treatments were as follows:

- No. 1. Untreated.
- No. 2. Dry manure (5 tons per acre).
- No. 3. Lime, (1 ton per acre).
- No. 4. Nitrate of Soda (400 lbs. per acre).
- No. 5. Muriate of Potash (120 lbs. per acre).
- No. 6. Acid Phosphate (430 lbs. per acre).
- No. 7. Nitrate of Soda (200 lbs. per acre).  
Acid Phosphate (215 lbs. per acre).
- No. 8. Nitrate of Soda (200 lbs. per acre).  
Muriate of Potash (60 lbs. per acre).
- No. 9. Acid Phosphate (215 lbs. per acre).
- No. 10. Complete fertilizer (320 lbs. per acre).
- No. 11. Complete fertilizer plus 2,000 lbs. of lime.
- No. 12. Wood ashes (900 lbs. per acre).

As regards the first object of the test it was found that even with the most careful manipulation, no marked differences were shown, either in the growth or transpiration of the plants variously treated. Greater differences were frequently found between duplicates of the same treatment than between different treatments. As regards the second object, it was found that with three of the types of soil no concordant results were obtained. With one type, the clay soil, the basket results agreed very favorably with those obtained on the same type with grass plots in the field.

The general conclusion, therefore, seems to be that the method, while simple and of comparatively easy operation, fails to determine with any considerable degree of accuracy the manurial requirements of our common types of soil. It is probable, however, that with soils markedly deficient in humus or in one or more particular elements, the method would have some value in making the determination.

## 2. CORN BREEDING.

This work has now been in progress for two years, with the object in view of securing a strain of dent corn which will be highly productive and of early maturity. The so-called "ear row method" is being used for the selection work in connection

with a careful scheme of breeding. The ear row test is a simple method of determining the comparative productivity of individual ears of corn by planting the kernels from each ear in a separate row of fifty hills. Each row is then cut and husked separately, and a record of its yield is kept. By saving out some of the kernels from each ear at planting time remnants are secured. The following year the remnants of the two best producing ears in the test are planted in a small, well-isolated plot, and by detasseling the stalks from one of the remnants, a direct cross between these two is secured.

By a repetition of this process for a few years, a strain of corn will be obtained whose pedigree will be known and whose ancestry will have been proved to be good producers. From the work thus far completed, it is evident that there is even a greater variation in the productiveness of individual ears of corn which are externally similar than there is between dairy animals of similar characteristics and appearance. For example, last year, which was a most unfavorable one for corn, the yields from fifty selected ears varied from 11 to 27 bushels per acre. While the testing of varieties is interesting and important, the real method of corn improvement, and the one to which we must look for results, is selection and breeding.

### 3. GRAIN CROPS.

During the season of 1907 the comparative yields and maturing qualities of 23 varieties of field corn and of 10 varieties of ensilage corn were obtained. A test was also made of 10 common varieties of oats to determine which was the most productive, the most rust proof and best adapted to New Hampshire conditions. These varieties varied in yield from 40 to 68 bushels per acre and from 29 to 34.5 lbs. per bushel, one known as Long's White Tartar proving the best all-round variety.

A three-quarter acre plot of winter wheat yielded at the rate of 30.75 bushels of grain and 2580 lbs. of straw per acre. This grain was sold at the rate of \$1.25 to \$1.50 per bushel. On the wheat ground grass seed was sown the latter part of March, and a most excellent catch was secured, thus showing a new method of seeding down for New Hampshire conditions. Spring wheat yielded at the rate of 18.2 bushels of grain and 3010 lbs. of straw per acre.

During the present season the yields and maturity of 29 varieties of field corn and of 12 varieties of ensilage corn have been determined, but are being reserved for a separate publication on Corn Culture. Twelve varieties of oats, two of wheat

and five of barley were tested this year, the results of which will be published later.

#### 4. FERTILIZATION OF GRASS LAND.

Certain tests begun in 1907 and planned to continue until 1912, or later, are being conducted on a heavy clay soil with a series of 47 plots, 30 of which are 1-10 acre and 17 are 1-20 acre. Each plot has been plowed as a separate land, and a 3-inch tile drain has been placed between every other one of them. The plots thus have equal surface and underdrainage, which is very essential for uniform results.

The objects of this experiment are, first, to secure data upon the yields of hay from continuous growth upon unfertilized land; second, to determine what fertilizer constituent is most needed in the given type of soil; third, to determine in what form any given constituent can be most economically applied; fourth, to determine the amounts of any constituent, or constituents, which will produce the largest yields; fifth, to determine the effect of lime alone, and in conjunction with various combinations of fertilizers; sixth, to afford an opportunity to study the question of the "availability of potash." The last two are matters of chemical concern and are being investigated by the chemical department.

The scheme of fertilization is as follows:

TABLE I. *Plan of Grass Fertilizer Plots, 1907 to 1912.*

Plot.	Amt. per acre.	Kind of Fertilizer.	Plant food added per acre.
1.	200 lbs.	Nitrate of Soda,	30 lbs. Nitrogen.
2.	.....	Nothing,	.....
3.	150 lbs.	Sulfate of Ammonia,	30 lbs. Nitrogen.
4.	175 lbs.	Tankage,	13 lbs. Nitrogen.
5.	.....	Nothing,	17 lbs. Phos. Acid.
6.	215 lbs.	Acid Phosphate,	.....
7.	110 lbs.	Rock Phosphate,	30 lbs. Phos. Acid.
8.	.....	Nothing,	30 lbs. Phos. Acid.
9.	175 lbs.	Thomas Slag,	30 lbs. Phos. Acid.
10.	110 lbs.	Ground Bone,	27 lbs. Phos. Acid.
11.	.....	Nothing,	3 lbs. Nitrogen.
12.	60 lbs.	Muriate of Potash,	.....
13.	62 lbs.	Sulfate of Potash,	30 lbs. Potash.
14.	.....	Nothing,	30 lbs. Potash.
15.	450 lbs.	Wood Ashes,	23 lbs. Potash.
16.	300 lbs.	Land Plaster,	7 lbs. Phos. Acid.
17.	.....	Nothing,	135 lbs. Lime.
			75 lbs. Lime.
			.....

Plot.	Amt. per acre.	Kind of Fertilizer.	Plant food added per acre.
18.	10,000 lbs.	Manure,	{ 40 lbs. Nitrogen. 25 lbs. Phos. Acid. 40 lbs. Potash.
19.	{ 100 lbs.	Nitrate of Soda,	15 lbs. Nitrogen.
	{ 108 lbs.	Acid Phosphate,	15 lbs. Phos. Acid.
20.	.....	Nothing,	.....
21.	{ 100 lbs.	Nitrate of Soda,	15 lbs. Nitrogen.
	{ 30 lbs.	Muriate of Potash,	15 lbs. Potash.

TABLE I. *Plan of Grass Fertilizer (Continued.)*

22.	{ 108 lbs.	Acid Phosphate,	15 lbs. Phos. Acid.
	{ 30 lbs.	Muriate of Potash,	15 lbs. Potash.
23.	.....	Nothing,	.....
24.	{ 67 lbs.	Nitrate of Soda,	10 lbs. Nitrogen.
	{ 72 lbs.	Acid Phosphate,	10 lbs. Phos. Acid.
	{ 20 lbs.	Muriate of Potash,	10 lbs. Potash.
25.	400 lbs.	Nitrate of Soda,	60 lbs. Nitrogen.
26.	.....	Nothing,	.....
27.	300 lbs.	Sulfate of Ammonia,	60 lbs. Nitrogen.
28.	350 lbs.	Tankage,	{ 26 lbs. Nitrogen. 34 Phos. Acid.
29.	.....	Nothing,	.....
30.	430 lbs.	Acid Phosphate,	60 lbs. Phos. Acid.
31.	220 lbs.	Rock Phosphate,	60 lbs. Phos. Acid.
32.	.....	Nothing,	.....
33.	350 lbs.	Thomas Slag,	60 lbs. Phos. Acid.
34.	220 lbs.	Ground Bone,	{ 54 lbs. Phos. Acid. 6 lbs. Nitrogen.
35.	.....	Nothing,	.....
36.	120 lbs.	Muriate of Potash,	60 lbs. Potash.
37.	125 lbs.	Sulfate of Potash,	60 lbs. Potash.
38.	.....	Nothing,	.....
39.	900 lbs.	Wood Ashes,	{ 46 lbs. Potash. 14 lbs. Phos. Acid. 270 lbs. Lime.
40.	20,000 lbs.	Manure,	{ 80 lbs. Nitrogen. 50 lbs. Phos. Acid. 80 lbs. Potash.
41.	.....	Nothing,	.....
42.	{ 200 lbs.	Nitrate of Soda,	30 lbs. Nitrogen.
	{ 215 lbs.	Acid Phosphate,	30 lbs. Phos. Acid.
43.	{ 200 lbs.	Nitrate of Soda,	30 lbs. Nitrogen.
	{ 60 lbs.	Muriate of Potash,	30 lbs. Potash.
44.	.....	Nothing,	.....
45.	{ 215 lbs.	Acid Phosphate,	30 lbs. Phos. Acid.
	{ 60 lbs.	Muriate of Potash,	30 lbs. Potash.
	{ 135 lbs.	Nitrate of Soda,	20 lbs. Nitrogen.
46.	{ 145 lbs.	Acid Phosphate,	20 lbs. Phos. Acid.
	{ 40 lbs.	Muriate of Potash,	20 lbs. Potash.
47.	.....	Nothing,	.....

*Size of Plots 1 to 30, 1-10 acre; 31 to 47, 1-20 acre.*

Each plot will be fertilized exactly the same every year, and every third plot, in order to serve as a check on the others, will receive no fertilizer of any kind during the entire period. Since it is planned to have the series continue for a period of five to ten years, no definite results can be given at this time. It may be stated in general terms, however, that the nitrogen fertilizers are giving the best returns, with timothy and red top predominating, while the phosphoric acid and manure are encouraging the growth of the clovers.

#### 5. FERTILIZING OLD SOD LAND.

In the spring of 1904 an acre plot of a four-year-old sod on uniform sandy loam soil was divided into four equal sections. On April 20th section 1 received a mixture of 150 lbs. nitrate of soda, 100 lbs. acid phosphate and 50 lbs. muriate of potash at the rate of 300 lbs. per acre; section 2 received nothing; section 3 received nitrate of soda at rate of 300 lbs. per acre; section 4 received barnyard manure at rate of 12 tons per acre.

On April 21st, 1905, the same kinds and amounts of fertilizer were applied to the sections as in 1904. In 1906 no fertilizer or manure of any kind was applied, the object being to see how persistent the effect of the two previous applications would be. The results are given in the following table, where the nitrate of soda is figured at \$56, the acid phosphate at \$14, the muriate of potash at \$42, the manure at \$1, and the hay at \$14 per ton:

TABLE 2. *Showing Effect and Value of Fertilizers on Old Sod.*

	Complete Fert. Ton per A.	Nothing Tons per A.	Nitrate of Soda Tons per A.	Barnyard Manure Tons per A.
Yield 1904 .....	2.76	2.28	2.36	2.98
Yield 1905 .....	2.70	1.73	2.39	3.01
Yield 1906 .....	1.90	1.71	1.65	2.64
Total .....	7.36	5.72	6.40	8.63
Increased yield .....	1.64	0.00	.68	2.91
Value of increase.....	\$22.96	0.00	\$9.52	\$40.74
Value of fert. ....	11.90	0.00	16.80	24.00
Profit or loss.....	+ 11.06	0.00	-7.28	+ 16.74

The following conclusions may be drawn from the results in the table:

1. That a complete chemical fertilizer gives a very fair return but is not persistent.
2. That nitrate of soda alone was used at a loss; a lighter application would probably have been more economical.

3. That barnyard manure makes a good top-dressing for grass land, and that its effect is persistent.
  4. That sod lands of medium age can be greatly benefited by proper kinds of top-dressings.
6. FORAGE CROPS.

The principal work during the past two years in this line has been with alfalfa. Many inquire from farmers in all parts of the state have been received concerning it, and so much interest has been shown that continued study of the plant seems warranted. Our experience with alfalfa here is contained in Press Circular No. 1, published elsewhere in this report. During the past season co-operative tests on 1-4 to 1-2 acre plots have been conducted with farmers in various parts of the state. About three-fourths of these have reported good stands this fall, while the remaining one-fourth have had trouble with weeds, dry weather and ledgy soil. The two critical points in securing a stand seem to be in having a soil which is free from weeds, and one which will not heave with freezing.

A second important forage crop, especially for those engaged in sheep raising, is Dwarf Essex rape. This is a plant belonging to the Mustard family and is not unlike kale or headless cabbage, to which it is closely related. It is a plant of European origin, and is just being generally introduced into this country, as its merits are being found out. It may be sown any time between May 1st and July 1st, and will produce from five to six tons per acre of a very palatable, green forage. It may be sown either in drills or broadcast, about 2 1-2 lbs. of seed per acre being used in the former and 4 lbs. in the latter case. If the ground is free from weeds, broadcasting is preferable, but if it is inclined to be weedy sow in drills 30 inches apart and cultivate. The plants are not easily injured by frost, and when successive sowings are made, continuous pasturage may be had from the middle of July to the first of November.

7. SEED TESTING.

On account of the high percentage of weed seed, dead seed, and other foreign matter which we have found in commercial grass seed during the past few years, a press circular was published in January of this year, requesting all those who desired to have samples of grass seed inspected, to send them to the Station, where such inspection would be made free of charge. Thirty samples were received and reported on to the parties interested. The following table shows in a summarized way the results of the inspection:



## Legend to Columns

- I. Sample number.  
 II. Name and address of senders, and the kind and the number of weed seeds found in one pound of the seed.  
 III. Percent of vitality.  
 IV. Percent of purity.  
 V. Percent of foreign seed.  
 VI. Percent of dirt or inert matter.  
 VII. Number of seeds in one pound of the sample.  
 VIII. Number of immature or ungerminable seeds in pound of the sample.

TABLE 3. *Seed Inspection, 1908.*

I	II	III	IV	V	VI	VII	VIII
TIMOTHY							
6.	C. L. Jenness, Dover.....	97.20	99.79	0.21	0.0	966,384	27,059
	Red Clover 225; Goosefoot 225.....						
12.	Holbrook Groc. Co., Keene .....	96.0	99.81	0.0	.19	1,132,176	45,287
16.	C. L. Jenness, Dover.....	91.5	99.1	0.0	.90	1,097,266	88,516
20.	Hilliard & Kimball, Exeter.....	93.5	99.1	0.9	0.0	1,170,132	76,058
	Blue Vervain 1134; Evening.....						
	Primrose 1134; Alsike Clover 21,268.						
24.	Breck & Sons, Boston.....	95.0	99.94	0.0	0.06	1,187,748	59,387
28.	C. N. Dodge, Hampton Falls.....	95.0	99.41	0.29	0.3	931,600	46,583
	Rugel's Plantain 907; Alsike Clover						
	454; Sheep Sorrel 227; Ribgrass 227;						
	Crabgrass 227.....						
30.	Holbrook Groc. Co., Keene.....	94.0	99.78	0.12	0.1	1,092,643	65,558
	Red Clover 226; Crabgrass 226.....						
RED TOP							
3.	Holbrook Groc. Co., Keene .....	66.0	98.56	0.98	0.46	4,643,300	1,578,715
	Timothy 15,880.....						
5.	C. L. Jenness, Dover.....	67.0	85.7	14.3	0.0	4,240,372	1,399,422
	Timothy 235,934.....						
18.	C. L. Jenness, Dover.....	72.7	87.0	12.0	1.0	5,260,520	1,433,492
	Timothy 185,118.....						
23.	Breck & Sons, Boston.....	79.0	77.04	15.52	7.44	3,936,832	826,735
	Timothy 181,388; Rugel's Plantain..						
	3629 .....						
29.	C. N. Dodge, Hampton Falls.....	59.0	99.5	0.0	0.5	4,916,440	2,015,740
RED CLOVER							
2.	Holbrook Groc. Co., Keene. ....	88.0	98.83	0.63	0.54	278,441	33,413
	Timothy 544; Ribgrass 363.....						
7.	Geo. H. Brown, Manchester.....	85.0	95.34	2.86	1.8	311,032	46,655
	Timothy 8166; Green Foxtail 1633;...						
	Ribgrass 998; Bitten Dock 817; Sheep						
	Sorrel 363.....						
8.	Geo. H. Brown, Manchester.....	83.0	97.34	2.29	.37	293,808	49,947
	Timothy 1361; Green Foxtail.....						
	816; Sheep Sorrel 363; Bitter Dock..						
	272; Pigweed 272.....						
11.	Geo. H. Brown, Manchester.....	91.0	99.15	0.85	0.0	259,156	23,324
	Sheep Sorrel 3640; Ribgrass 420.....						
13.	Holbrook Groc Co., Keene.....	91.0	99.85	0.0	0.15	299,044	26,913
15.	C. L. Jenness, Dover, Ribgrass.....	78.7	93.91	4.85	1.24	349,216	74,383
	3539; Worm Seed 1361; Sheep Sorrel						
	725; Green Foxtail 726; Hoarhound						
	272.....						
19.	Hilliard & Kimball, Exeter, White	72.5	79.65	19.32	1.03	295,532	81,271
	Dock 19,872; Ribwort 6261, Sheep....						
	Sorrel 1543; Mexican Tea 1270; Green						
	Foxtail 726; Canada Thistle 635.....						
	Wormseed 364, etc.....						
22.	Breck & Sons, Boston, Ribgrass.....	78.25	95.72	3.09	1.19	364,312	79,237
	4265; Green Foxtail 635; Goosefoot..						
	1906; Sheep Sorrel 998; Timothy 726.						
26.	C. N. Dodge, Hampton Falls Rib-	82.5	97.62	0.83	1.55	285,356	49,937
	grass 363; Green Foxtail 181; Un-						
	known 1815.....						

TABLE 3. *Seed Inspection, 1908 (Continued).*

I	II	III	IV	V	VI	VII	VIII
	ALSIKE CLOVER						
1.	Holbrook Groc. Co., Keene.....	75.0	95.45	4.33	0.12	843,340	210,835
	Timothy 36,751; Sheep Sorrel 907....						
10.	Geo. H. Brown, Manchester.....	92.0	99.93	0.07	0.1	711,716	56,937
	Timothy 454.....						
17.	C. L. Jenness, Dover, Timothy.....	84.0	96.0	3.75	0.25	705,356	112,856
	14,155; Sheep Sorrel 362; Crabgrass						
	181; Unknown 272.....						
25.	Breck & Sons, Boston, Timothy.....	86.25	90.6	9.4	0.0	783,288	107,702
	119,328; Sheep Sorrel 4310; Evening						
	Primrose 680; Green Foxtail 227;....						
	Peppergrass 227.....						
27.	C. N. Dodge, Hampton Falls.....	89.5	98.18	1.82	0.0	663,816	69,700
	Timothy 17,014; Canada Thistle 227;						
	Lamb's Quarters 227.....						
	ALFALFA						
4.	H. T. Corey, Manchester.....	92	98.9	0.48	0.62	258,325	20,346
9.	Geo. H. Brown, Manchester.....	79.5	99.16	0.74	0.10	254,324	52,136
	Ribgrass 1814; Golden Hawkweed....						
	182.....						
21.	Breck & Sons, Boston, Ribgrass 272; 98.5	99.24	0.28	0.48	226,860	3,403	
	Unknown 453.....						

## 8. CO-OPERATIVE WORK.

During the past season three lines of co-operative work have been carried on by this department in various parts of the state. These are as follows:

1. The growing of alfalfa.
2. The growing of ensilage corn.
3. Fertilizer tests with corn.

In the tests with alfalfa the station furnished the necessary seed for 1-4 to 1-2 acre plots, and gave directions and suggestions for preparing the ground and sowing the seed. Twenty-five farmers co-operated in the work this season.

Two farmers in the vicinity of Whitefield co-operated in the growing of ensilage corn for the purpose of finding the comparative maturity and adaptation of different varieties in the northern part of the state. In this case the Station outlined the test and furnished the seed.

A co-operative test with fertilizers on tenth acre plots of pop-corn, was conducted at East Wakefield. The purpose being to determine the fertilizer needs of the ridge soils in that vicinity. The Station furnished and mixed the fertilizers and supervised the planting and handling of the crop.

### III. ANIMAL HUSBANDRY.

The work in Animal Husbandry has been carried on under four heads, namely:

1. Sheep breeding (Early lamb production).
2. Sheep feeding.
3. Pig feeding.
4. Comparison of corn stover and hay for dairy cows.

#### I. SHEEP BREEDING.

The sheep breeding work, as outlined in the previous report, was carried on during the season of 1907-08, as follows:

The breeding season opened August 1st and continued until October 26th. The flocks, five in number, were headed respectively by pure bred Hampshire, Shropshire, Dorset Horn, Lincoln and Southdown rams. Each flock consisted of pure bred ewes of the same breed as the ram heading the flock, grade Rambouillet ewes, and native ewes.

The lambs following this breeding season began to come on December 29th, with the pure bred Dorset Horn and Rambouillet ewes lambing earliest.

The average birth weight of lambs sired by the Hampshire ram was 9.5 lbs; of lambs sired by the Shropshire, 7.7 lbs; of lambs sired by the Dorset Horn, 8.4 lbs; of lambs sired by the Lincoln, 8.43 lbs. The Southdown ram proved a non-breeder. The weekly gains made by the lambs sired by these several rams were carefully studied and compared. The heaviest gains were made by lambs sired by the Hampshire and Shropshire rams. The lambs sired by the Dorset Horn ram ranked third as regards gains, and those sired by the Lincoln ram fourth. All of the Hampshire and Shropshire crosses fattened well and also made growth; the Dorset Horn and Lincoln Rambouillet cross did not fatten well; hence they did not make desirable carcasses when dressed. With but one exception the lambs sired by the Lincoln ram did not make good killing lambs.

The early lamb market requires a lamb which is young, short in legs, short and broad in body, well fattened and dresses between 25 and 30 pounds.

The following cuts, with descriptions, show the desirable types and undesirable types in early lambs; also the characteristics of lambs of the crosses above mentioned.

On April 20th five lambs were dressed and shipped to the Boston Market. Total selling price \$26.00.

On May 25th thirteen lambs were dressed and shipped to the Boston Market. Total selling price \$76.00.

The first consignment of lambs was put on a low market. The second consignment was put onto a better market, and, as a whole, was a better class of lambs.

The demand of the market is for the better lambs; with better lambs a higher price can be obtained. Much depends upon the type of sire used.

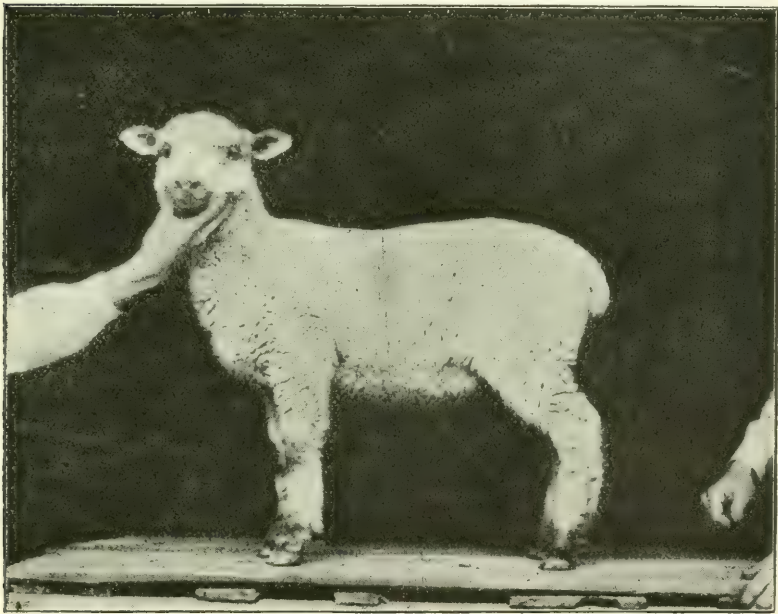


FIG. 6. Shropshire-Rambouillet. Ewe Live weight, 52 lbs.; Dressed weight, 26 lbs.; Dressing per cent., 50. Type: Blocky and fat. A very desirable lamb.

The earlier the lambs can be put onto the market the higher the price will be. In order to have early lambs the ewes must be induced to breed as early as August, at least. This can be accomplished by taking the lambs from the ewes early and allowing them to recuperate on rich, succulent pasture before the ram is let to them. The best succulent pasture that can be sown for ewes is rape. It will have a tendency to increase the

condition of the ewes quickly and fit them for ram service early.

## II. SHEEP FEEDING.

On March 25th 8 yearling ewes and 8 aged ewes were divided into two lots, 4 yearlings and 4 aged ewes in a lot, for the purpose of comparing Xtravim Molasses with corn meal, as a fattening feed for sheep.

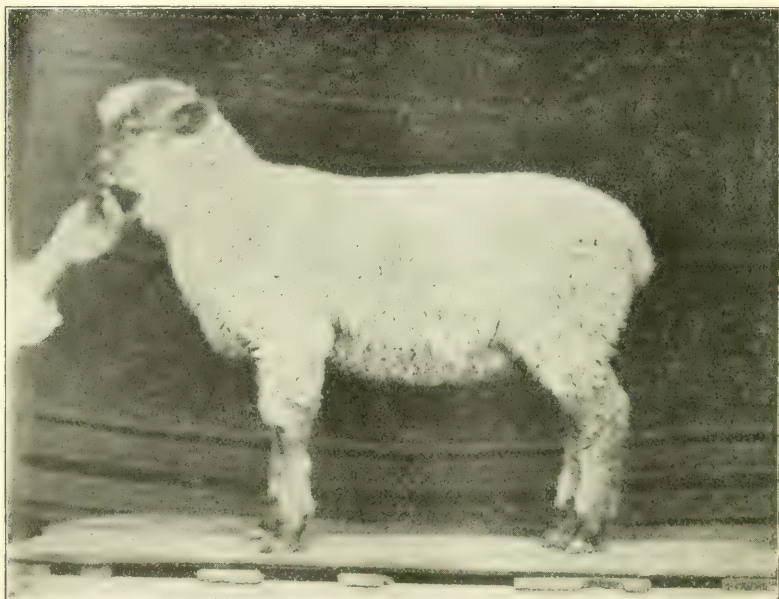


FIG. 7. Shropshire-Native. Ram. Live weight, 60 lbs.; Dressed weight, 28 lbs.; Dressing per cent., 46.6. Type: Blocky, not so fat as 1.

Lot I was fed molasses, middlings and oats in the following proportions for concentrated feed: Molasses 1-2, Middlings 1-4, Oats 1-4. Their roughage was second crop clover.

Lot II was fed corn meal, middlings and oats in the following proportions, as a concentrated feed: Corn meal 1-2, middlings 1-4, oats 1-4. Their roughage was second crop clover.

Lot I received 1.13 lbs. of the molasses and grain mixture and 1.52 lbs. hay per head, per day.

Lot II received 1.17 lbs. of the grain mixture and 1.52 lbs. hay per head per day.



The preliminary feeding period was from March 25th to April 1st. The feeding period was 60 days in length, lasting from April 1st to May 31st.

The gain of Lot I was 1.4 times that of Lot II, and was made 1.5 times cheaper for each 100 lbs. gain.

### III. PIG FEEDING.

On October 5th 15 shoats, averaging in weight from 141 to 151 lbs., were divided into five lots, three in a lot, for fattening.

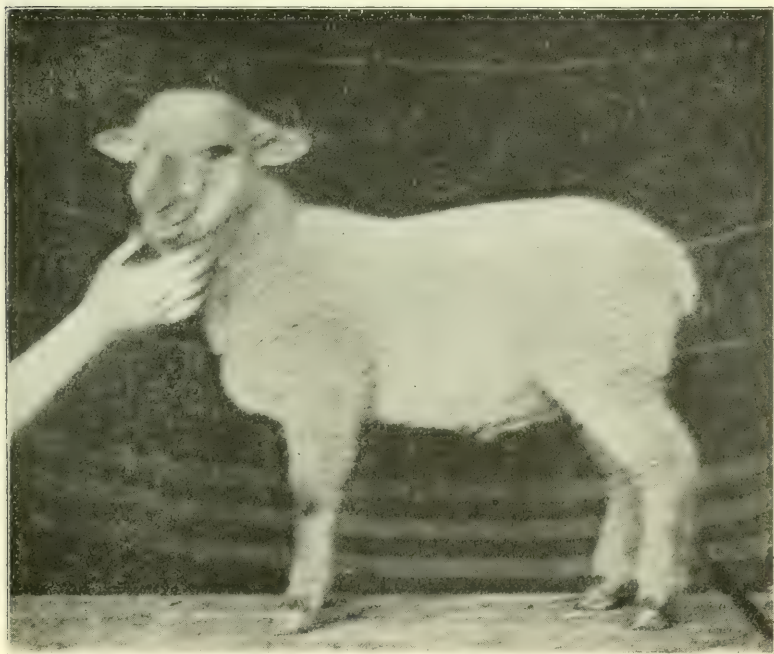


FIG. 8. Hampshire-Rambouillet. Ram. Live weight, 62 lbs.; Dressed weight, 30 lbs.; Dressing per cent., 48. Type: Blocky, low and thick; fast growing and easy fattening.

These lots were fed 7 days as a preliminary feeding period, on the feeds used in the experiment. On October 11 and 12th they were again weighed, an average taken and these weights used as initial weights. The feeding period extended from Oct. 12 to Nov. 16th, a period of 35 days, with the following results:

At the end of the feeding period all of these lots were in good market condition, Lot I being the least desirable.



Lot I, fed soaked shell corn, gained 87.2 lbs. at a cost of 7.3c. per pound.

Lot II, fed shelled corn and skim milk, gained 141 lbs. at a cost of 7.4c. per pound.

Lot III, fed shelled corn and middlings, gained 99.3 lbs. at a cost of 8.9c. per pound.

Lot IV, fed shelled corn, middlings and skim milk, gained 129 lbs., at a cost of 8.2c. per pound.

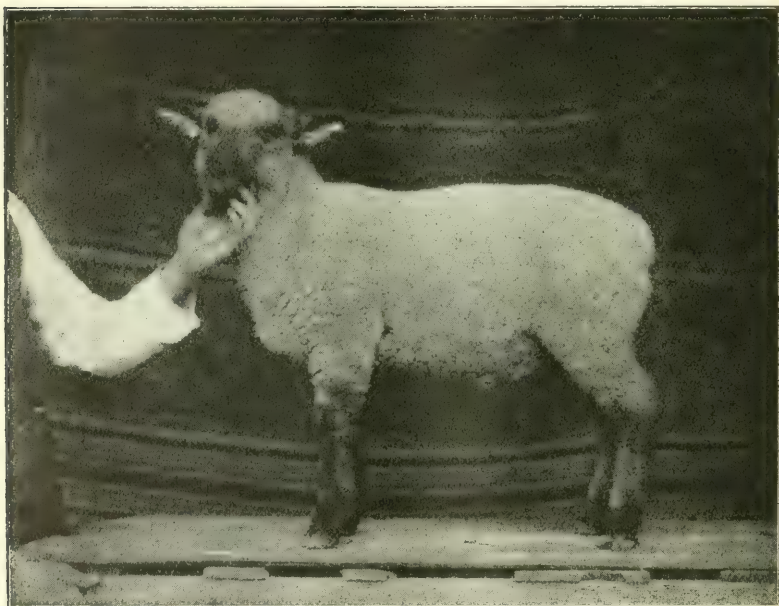


FIG. 9. Hampshire-Native. Ram. Live weight, 54 lbs.; Dressed weight, 27 lbs.; Dressing per cent., 50. Type: Broad and deep bodied, but a trifle too long legged.

Lot V, fed shelled corn, middlings and molasses, gained 104.7 lbs., at a cost of 8.89c. per pound.

In the above feeding test none of the gains were satisfactory; too much feed was consumed for the gains returned. The cost of gains were too high in all cases. This can be explained by the fact that the price of grain was high, the hogs were started on feed at an age when the cost of grain is high, and the total gains were too low.

## IV. COMPARISON OF CORN STOVER AND HAY FOR DAIRY COWS.

In view of the fact that several inquiries had been received concerning corn stover in dairy rations, and also that considerable corn stover was left for feed it was deemed wise to feed it to the best advantage to the dairy cattle, and to determine its value from the feeding standpoint.

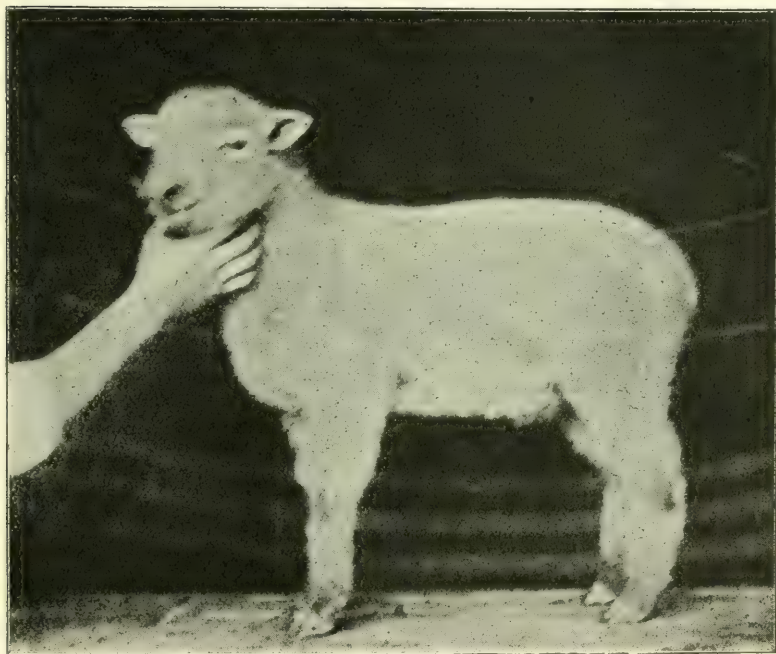


FIG. 10. Lincoln-Native. Ram. Live weight, 47.5 lbs.; Dressed weight, 24.5 lbs.; Dressing per cent., 51.1. Type: Blocky, low set; broad and fat.

Accordingly, four cows in about the same period of lactation, constituted two lots which were fed as follows:

Lot I consumed 489 lbs. grain, 1125 lbs. corn stover and 1645 silage, from January 20th to February 19th, and produced 1622.3 lbs. milk, testing 3.75 per cent., making 59.76 lbs. butter fat.

Lot II consumed during the same period 489 lbs. grain, 1240 lbs. cut corn stover and 1645 lbs. silage, and produced 1221.1 lbs. milk, testing 4 per cent., and making 48.84 lbs. butter fat.

On Feb. 20th the feeding of corn stover and hay was reversed from Lot II to Lot I, Lot II receiving hay and Lot I receiving corn stover.

The period from February 20 to March 1 was used to get the cows well started. The second feeding period started on March 1st and extended to March 30th.

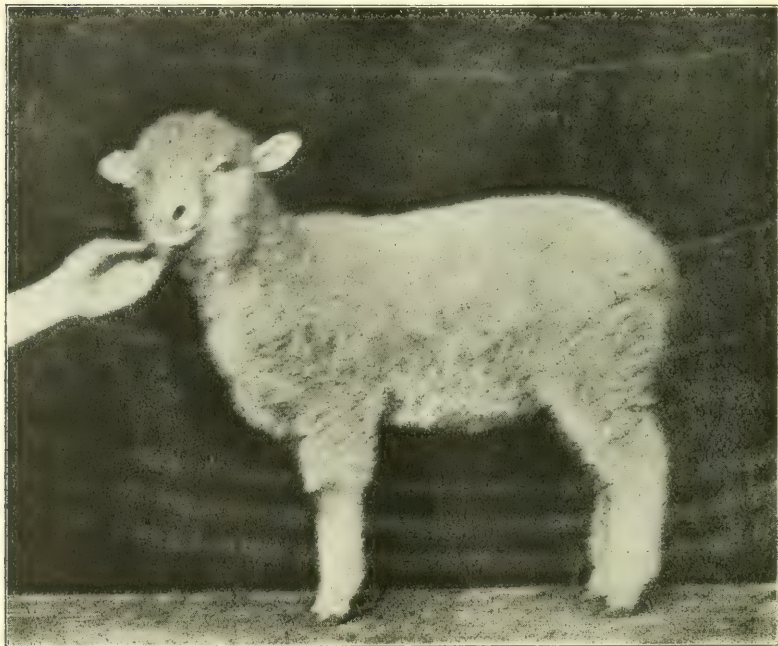


FIG. 11. Lincoln-Rambouillet. Ewe. Live weight, 56.5 lbs.; Dressed weight, 25 lbs.; Dressing per cent., 44. Type: Long and hard to fatten.

Lot I consumed 517.5 lbs. grain, 1057 lbs. corn stover and 1860 lbs. silage, and produced 1345.8 lbs. milk testing 3.65 per cent., and making 50.17 lbs. butter fat.

Lot II consumed 508 lbs. grain, 1222 lbs. hay and 1860 lbs. silage, and produced 1269.4 lbs. milk testing 3.9 per cent., and making 49.42 lbs. butter fat.

2297 lbs. corn stover, in conjunction with 3505 lbs. silage and 1006.5 lbs. grain, yielded 2566.1 lbs. milk and 99.01 lbs. butter fat.

2347 lbs. hay, in conjunction with 3505 lbs. silage and 1006.5 lbs. grain yielded 2891.7 lbs. milk and 109.18 lbs. butter fat.

The hay fed was straight Timothy. The cows in Lot I, when put onto corn stover, lost flesh. The cows in Lot II, when put onto timothy hay, gained flesh.

## REPORT OF THE DEPARTMENT OF ANIMAL HUSBANDRY.

W. H. PEW, ANIMAL HUSBANDMAN.

On July 1st, 1908, the Animal Husbandry Department was made a separate department. The work of this department has been planned as follows:

1. Sheep Breeding. (New Project.)
2. Sheep Feeding.
3. Pig Feeding.

### I. SHEEP BREEDING. (NEW PROJECT.)

The sheep breeding work during the year past was carried on under the Hatch Fund. On April 1st new work was outlined under the Adams Fund, as follows:

#### A. Objects.

1. To determine the principles involved and best methods to be employed in grading up a flock of sheep, particularly for early lamb production, studying the characters of crosses with reference to Mendel's law.
2. To determine the principles involved in fixing certain characters in sheep, studying the closeness with which the characters of the hybrids follow Mendel's law, and their application to breeding problems.

#### B. Plan.

##### 1. Plan of object. (1)

a. Breed a pure-bred Dorset Horn ram to Grade ewes of uniform type; select from this cross representative males and females; breed these together to produce some characters which are pure; choose the most desirable character and perpetuate it by the use of successive generations of these crosses, as breeding stock, studying the characters of the generations to determine how closely they follow Mendel's law.

The Dorset Horn ram will be used in this line of breeding because the Dorset Horn breed combines early breeding and heavy milking qualities.



## 2. Plan of object (2).

a. Breed a pure-bred Hampshire ram to pure bred Rambouillet ewes; using this cross because of the color markings and form of the Hampshire, and the fleece of the Rambouillet. In succeeding matings use the progeny of this cross; study the hybrid characters; how closely

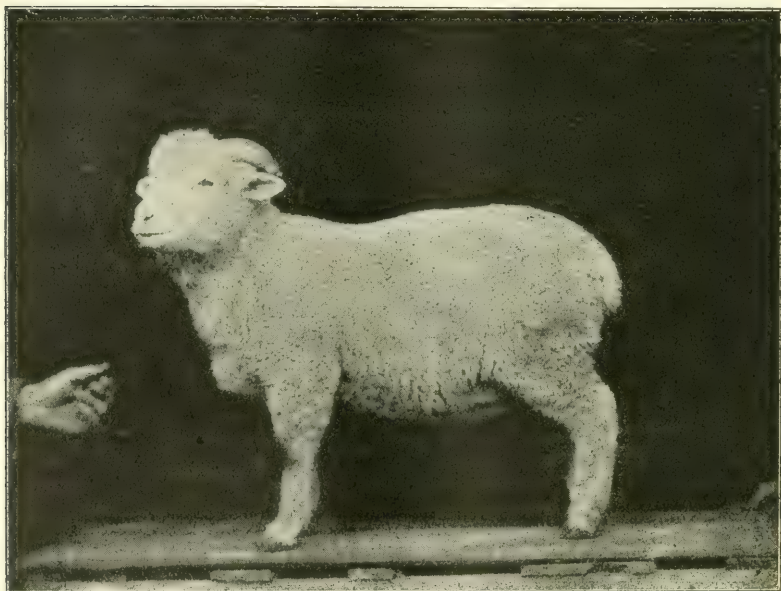


FIG. 12. Dorset-Rambouillet. Ram. Live weight, 56 lbs.; Dressed weight, 21 lbs.; Dressing per cent., 37.5. Type: Lacked flesh and thickness; very heavy paunch. Very poor dressing type of lamb.

they follow Mendel's law and how they may be applied to breeding problems.

b. Make reciprocal crosses with the Dorset Horn and Southdown breeds using: 1st, the Southdown ram on Dorset Horn ewes, and 2d the Dorset Horn ram on Southdown ewes. Study closely the Mendalian characters shown by these crosses and their value to practical breeding problems.

These reciprocal crosses will be made to determine the influence of the male and female of each breed.

c. Study the fecundity of strains of breeds of sheep, and perpetuate this quality by crossing with multi-nippled sheep. The fecundity of Dorset Horn Sheep will be studied with reference to the flock records and information gathered from breeders. No breeding will be done for one year, but data will be gathered.

Inasmuch as the Lincoln crosses did not prove out successfully for early lamb types, it has been thought best to discard these crosses and breed up a small flock of pure bred Lincolns, adapted to New Hampshire conditions. These pure bred will be utilized in the future in breeding for wool characteristics.

Co-operation in this work has been arranged with the Department of Experimental evolution of the Carnegie Institute, Cold Spring Harbor, N. Y., whereby the Director of this Department makes two trips a year to the New Hampshire Experiment Station and inspects the work as previously outlined, offering suggestions as the work progresses. This will be of great value to the experiment, as a large amount of experimental work on breeding questions has been done at the Carnegie Institute.

Thus far the work has been carried on as outlined.

The lambs were taken from the ewes early so that they were given a chance to recuperate. On July 15th the entire flock of ewes were put onto a piece of well grown rape and kept there until August 1st. About July 25th, 2 pure bred Hampshire ewes, 2 pure bred Shropshire ewes, 3 pure bred Dorset ewes, and 4 pure bred Rambouillet ewes were added to the breeding flock. A yearling Southdown ram and yearling Hampshire ram, both of grand type, were purchased to head their respective flocks.

The breeding season opened on August 1st. A number of ewes were bred the first week in August. During the month between thirty-five and forty ewes were bred. The earliness of breeding is due to the increase in condition of the ewes pasturing on the green, succulent rape.

Before another grazing season opens, more pasture land must be provided for the sheep; a shortage of pasture has been a great handicap to the work this year, as the pasture land allotted to the sheep work is insufficient on account of lack of acreage, as well as productiveness. The rape sown for the sheep proved of great value during July and August, but was insufficient to carry through the fall months.



## II. SHEEP FEEDING.

A continuation of the sheep feeding work, carried on last spring, will be made next spring. A further study of molasses in the sheep ration will be made. The number of sheep that will be available cannot be determined at this time.

## III. PIG FEEDING.

There are a number of problems confronting the hog grower from the feeding standpoint, the greatest of which is the growing of hogs with profit without depending upon waste products.

Green forage crops for growing pigs is attracting attention. The feeding of packing house by-products is becoming more prominent. In order to do satisfactory experimental work along this line proper equipment in the way of a piggery must be provided.

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REPORT OF THE DEPARTMENT OF BOTANY.

CHARLES BROOKS.

## ORGANIZATION AND EQUIPMENT.

Since July 1, 1908, Mr. Isaac M. Lewis has served as assistant in botany. He has made the leaf spot of apples a subject of special investigation and gives his results and conclusions under that head in this report.

The great need of the department is a small greenhouse in which plants may be reared, and where inoculation experiments may be carried on under known conditions. Because of the lack of this, it has often been necessary to leave the relation of a fungus to its host undetermined and the most important problems in connection with certain diseases unsolved.

## INVESTIGATIONS.

*The Physiology of the Baldwin Apple Tree.* One of the problems undertaken under the Adams Fund was a study of the physiology of the Baldwin tree with special reference to the determination of the factors controlling the formation of fruit buds. Such literature as bears upon the subject has been reviewed, buds gathered at various seasons of the year have been studied, experiments in artificial nutrition made, and experiments carried out to determine the effect of overbearing. The work is not near enough completion to justify a full report.

*Fruit Spot of Apples.* A second line of work under the Adams Fund is the determination of the cause, nature and prevention of certain little understood diseases. The first problem taken up was the Fruit Spot of apples. The work has been brought practically to completion. The results and conclusions are given on pages 332-365.

*Leaf Spot of Apples.* A second disease investigated under the same fund was the Leaf Spot of Apples. A preliminary report on this is given on pages 365-370.

*Pine Blight.* Considerable time has been given to an investigation of this much talked of trouble. The information is reported and discussed on pages 370-371.

*Fungous Diseases of the State.* An important line of work under the Hatch Fund, has been a study of the diseases of plants as they occur in the state. Much of the correspondence of the department has been in answer to inquiries as to the identity and prevention of these diseases. A record has been kept of the extent and nature of these troubles, and a partial report is given on pages 371-382.

*Fungicides.* Experiments have been made to determine the value of various proprietary fungicides that are now upon the market, and in search of a fungicide that has the efficiency of bordeaux but is less likely to russet the fruit. See pages 382-385.

*Government Cooperative Work.* A part of the work on fungicides has been carried on in co-operation with the Bureau of Plant Industry, U. S. Department of Agriculture. See pages 385-389.

*Apple Diseases.* Extensive experiments have been made in the control of apple diseases. The results are quite conclusive. See pages 332-370 and 382-389.

*Potato Diseases.* In the summer of 1907 various fungicides and several methods of spraying were tested on potatoes. There was no late blight that season and the early blight was not very serious. The foliage on the sprayed potatoes was green until frost, while that on the unsprayed ones was practically dead ten days before that time. The potatoes used in the experiments were planted late and the sprayed plants were killed before maturity by the frosts of September 18. The yields obtained showed decided advantage from spraying. The results did not make it conclusive as to the comparative value of the various fungicides, and can be discussed better after further tests have been made.

*Cucumber Diseases.* In view of the widespread destruction of the cucumbers by blight in 1906, experiments were planned the

next season to determine the best fungicides for the control of the disease and the best method of application. No blight occurred that summer and no benefit was seen from spraying.

*Weeds and Their Destruction.* The large number of inquiries in regard to the identity of weeds and as to the best means of destruction, made special demand for definite data upon the use of chemicals for their control. The work on this problem is reported on page 389.

#### \*THE FRUIT SPOT OF APPLES.

CHARLES BROOKS.

(WITH PLATES 1-7)

A considerable percentage of the Baldwin apples of New England are marred by the presence of certain fruit spots, described in the Bulletins of the New Hampshire Experiment Station as the Brown Spot of Baldwins. The following paper is a report of the results obtained in an effort to determine the cause of this spot, its morphological and physiological characteristics, and means of prevention. A brief review of earlier work on this and closely related effects will be of value in the later presentation of the subject matter.

#### REVIEW OF LITERATURE.

In 1879 Sorauer (1) described a disease which he called the "Stippichwerden der Aepfel." According to his description, brown or blackish brown spots developed on the surface of the fruit, extending into the flesh only .5 to 1.5 mm. These spots remained isolated and never involved the whole fruit. He found that they might remain without development for a long time and later develop rapidly in storage. He considered the spots to be due to a decomposition produced by a particular fungus and gave *Spilocaea Pomi*, previously described by Fries (2), as the probable agency.

Reichelt (3) reported a similar spot on apples but found that it was caused by a fungus belonging to the genus *Synchytrium*.

Frank (4) thought that the *Spilocaea Pomi* of Fries was a sterile form of *Fusicladium dendriticum*, thus making the "Stippen der Aepfel" identical with scab.

Wortmann (5) made extensive studies of the "Stippen der Aepfel." He described the disease as producing numerous brown spots on the surface of the fruit. At first these were but 1 to 5

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\*Offered as a thesis at the University of Missouri in partial fulfillment of the requirements for the degree of doctor of philosophy.

mm. in diameter and entirely separate and distinct, but later they might become larger and more numerous, practically covering the entire surface of the apple. The spots usually developed after the fruit had been gathered and while it was passing through its final ripening processes, but with especially susceptible varieties they sometimes appeared while the apples were still on the tree. The tissue beneath these spots was browned, possessed an over-abundance of starch and in late stages was bitter to the taste. He did not consider the disease to be of fungous origin, not only because he was unable to find any trace of mycelium in the affected tissue but also from the fact that the spots were often covered by a smooth and unbroken epidermis and might be found at a depth of one centimeter from the surface and entirely separated from all other affected tissue. He believed that the disease was a physiological one and that conditions of transpiration were largely responsible for its occurrence. He found that varieties of apples that were susceptible to spotting had more lenticels and a thinner-walled epidermis than those less affected by the disease. On the other hand, these same susceptible varieties gave off less water in transpiration than the more resistant ones. From these observations and from the previously known fact that spotting might be prevented by a rapid drying of the fruit, he drew the conclusion that the extent of the disease was not determined by the actual amount of transpiration but by the readiness with which water was conducted from deeply seated cells to replace that lost in transpiration. The varieties that had the slowest rate of conduction were the ones that were most seriously affected. The concentration of the cell sap in the exposed tissue was the real cause of the injury and the acids and acid salts were the active agents in killing the cells. As an explanation of the fact that apples do not become spotted when dried very rapidly, he suggested that under such conditions the acid did not have time to act. He believed that the nature of the substances in the cell sap partially accounted for the differences in the susceptibility of different varieties.

Zschokke (6) presented a detailed report in regard to the structure of the epidermis in core-fruits with special reference to the part it plays in determining their keeping quality. His description of the "Stippen," and his conclusions in regard to it are almost identical with those of Wortmann.

In Australia a disease supposed to be identical with the "Stippen" is described by Cobb (7) as Brown or Bitter Pit.



Craig (8) described a similar disease occurring in Canada as the Dry Rot of the apple. He found that sixty different varieties of apples were susceptible, but that the Baldwins were affected most seriously.

In the United States the spotting of apples has been repeatedly described and variously named. Selby (9) reported a disease of Northern Spies and other varieties which produced small brown spots just beneath the skin of the apple and which usually did not extend to any great depth into the tissue. He found no fungus present and considered it a breaking down of cells brought about by seasonal conditions.

Jones (10) described the "Brown Spot of the Baldwin Apple" as producing brown sunken spots the size of a pea or larger on the surface of the apple. The flesh underneath these spots showed a brown discoloration for an eighth of an inch or more in depth. The discolored portion was quite bitter to the taste. Specimens of the diseased fruit placed in a moist chamber soon developed small grayish pustules at or near the center of the spot, the pustule being from a sixteenth to an eighth of an inch in diameter. Specimens of the fungus were sent to J. B. Ellis for identification who reported that it was probably *Dothidea pomigena* Schw. Later, Jones (11) stated that the fungus occurring in the spots was quite different from the above species. In most cases, especially in the autumn and early winter, no fungus was detected in the browned tissue. When it was present it was quite obscure. The fungus was not identified because of inability to secure satisfactory fruiting specimens. He considered the fungus a saprophyte and of minor importance so far as the disease was concerned. In the latter publication the spotting was given the following description:

"The disease usually appears superficially on the fruit as small sunken brown spots scattered over the surface of the apple, but more abundantly near the eye or apical portion. These spots may appear before maturity, but usually are seen only after the apples have lain in storage for some time, and tend thereafter to increase in number and size. The spots usually vary in diameter from two to five millimeters. The superficial spots usually lie immediately underneath the epidermis, which in the earlier stage of their development is unbroken. Upon cutting into such a spot it is found to consist of rather dry, dead and browned tissue, extending into the flesh for a distance about equal to its diameter. Similar areas of dead and brown tissue may occur scattered at various depths in the flesh nearly to the core. Examination shows the spots

to be associated in their distribution with the occurrence of the vascular bundles of the fruit. The browned tissue may have a slightly bitter flavor in the older spots, but this bitterness is not constant and in no case in our observation is it very decided."

He found that while the spotting was worse on Baldwins than on any other variety it was quite common on Northern Spies and occurred on Greenings.

Stewart's (12) description of the "Baldwin Spot" is quite similar to that given by Jones. He did not detect the bitter taste that Jones had found the browned tissue to have. The smallest spots might show no brown color at all but he indicated merely by a deeper red color of the skin if situated upon the colored part of the fruit, or by a green color if situated upon the lighter portion. At the time the fruit was gathered the spongy tissue was found only underneath the surface spots, but after it had lain some three weeks in the laboratory many brown spots were found distributed irregularly through the flesh of the calyx half of the fruit, but not in the stem half. Apples placed in moist chambers showed no development of any fungus and pieces of browned tissue transferred to various culture media gave no growth. No beneficial results from spraying had been observed. In a later bulletin (13), an orchard was reported in which the disease had been almost entirely prevented by spraying. The most susceptible varieties were Baldwin, Northern Spy, and Rhode Island Greening.

Clinton (14) described the "Baldwin Spot" as showing first in the fall as small sunken rotten spots on the surface of the fruit and later as isolated brown spots within the flesh, the tissue in these often collapsing.

In a later report (15) he described another disease of the apple which he called the "Fruit Speck." This disease showed superficially as small spots or specks scattered over the skin. These areas of brownish dead tissue usually varied from the size of a pinhead to a quarter of an inch in diameter and extended but slightly into the flesh. He could frequently see small ruptures at the center of the specks. Diseased tissue when placed in sterile culture media developed a fungous growth. The fungus in the various cultures was apparently the same. Talman Sweets were most seriously affected, Northern Spies suffered less, while Baldwins were injured but little.

Longyear (11) reported a disease common on Baldwins and other varieties in Michigan which he called the "Fruit Spot" of apples. He described it as appearing in the form of small, cir-



cular, slightly sunken spots of a brown color. The brown discoloration usually extended but a little way into the flesh of the fruit and the affected part possessed a bitter taste. The spots gave rise to spore-producing pustules. *Phyllachora pomigena* (Schw.) was credited as the cause of the trouble. Spraying as for scab was found greatly to reduce the disease.

Lamson (17) has published a number of reports on the "Brown Spot of Baldwins" as it occurs in New Hampshire. He gave the following description of the disease: "It is characterized by the appearance on the surface of the apple of numerous small brown spots, varying in diameter from a sixteenth to an eighth of an inch. The spots are slightly sunken or depressed so that the surface has a pitted appearance. They suggest the beginning of rot but do not increase in size ordinarily, though occasionally they do. The disease appears late in the season. The chief injury is to the appearance of the fruit. This is often so much damaged that otherwise perfect apples become seconds." He found that fungicides practically controlled the disease.

For the past two years the writer has been making a study of the spotting of New Hampshire apples. The results obtained are given under the various headings that follow. A knowledge of the host is necessary to an understanding of a disease.

#### THE STRUCTURE AND DEVELOPMENT OF THE APPLE.

*Epidermal structure.*—The epidermis of the apple consists of a single layer of cells, the outer walls of which are strongly thickened. These outer walls consist largely of cutin, which as the apple matures is impregnated and covered with a resinous and waxy substance. The apple is thus furnished with a covering that at most points is practically impervious to water and fungi. Many unicellular hairs are found on the surface of the young fruit. The somewhat conical bases of these are inserted between the other epidermal cells. These hairs disappear when the apple is a few weeks old, but before this time the cuticle of the apple has considerable thickness. Zschokke (6) found that in dropping from the apple the hairs might break even with the outer edge of the cuticle, leaving their conical bases behind, but that more frequently they loosened themselves from the surrounding epidermal cells, leaving a deep scar, which, in the latter development of the fruit, might become a definite break in the epidermis. The writer's observations agree with those of Zschokke. As late as the first of August these hair pits were quite common in the epidermis.

In the young fruit the stomata furnish such openings in the epidermis as are necessary for the passage of gases and liquids. They are very numerous early in the year and while the majority of them disappear later they are still quite common on the mature fruit. From three to four weeks after the fall of the blossoms numerous cork-like flecks begin to appear on the apple surface. The majority of these are lenticels (Plate 4, Figure 4.) When the epidermis of the young apple is broken either through a natural or foreign agency, the opening is rapidly covered with cork cells. According to Zschokke (6) the lenticels develop as a result of breaks in the epidermis caused by the rapid enlargement of the apple, the stomata being the points that yield most readily to the strain. In a typical lenticel the cells are arranged in definite layers. In the apple the structure of these corky specks varies all the way from that of a typical lenticel to a few thick-walled cork cells promiscuously arranged beneath a minute break in the cuticle. Their early structure leads the writer to the opinion that while the majority of them develop at stomata others probably originate from the pockets left by the falling hairs.

The lenticels are far more numerous on the blossom half than on the stem half of the apple. This statement is based on actual count as well as on general observations. A square centimeter was marked off on the stem half of an apple and another on the blossom half and the lenticels counted on these areas. By averaging the results secured from the Baldwins the ratio of seven to four was obtained as that existing between the number of lenticels on the blossom and stem halves of the apple. On Northern Spies the ratio was approximately five to three.

*Hypodermal parenchyma.*—Immediately beneath the epidermis are layers of cells that are distinctly different from those more deeply situated. These cells are smaller and more compactly arranged. They are oblong in shape with their greatest diameter parallel to the epidermis. They are well supplied with chlorophyll and evidently take an active part in the nutrition of the apple. They contain the red coloring-matter of the ripe fruit, which, according to Pick (18), develops from tannin under the influence of sunlight. There is a gradual transition from these cells to the large isodiametric ones that make up the mass of the apple tissue.

*Vascular system.*—The close relation of the conducting system to spot diseases makes a study of the vascular bundles of interest in this connection. The general distribution of these could be studied best in frozen apples. With these the soft

flesh could be nearly all removed by holding the half of an apple under the current from a laboratory faucet. The remaining portion of the apple could be very satisfactorily studied by floating in water. If an apple is cut in halves perpendicular to the core, ten green spots may be seen arranged in the form of a circle about midway between the core and the epidermis (Plate 3, Figure 1.) These are the large vascular strands of the apple. Smaller branches are given off from either side of them. Figure 7, Plate 7 is a sketch of one of these ten vascular strands with the branches that arise from one side of it *i. e.*, it shows about one-twentieth of the vascular system of an apple. The main branches give off comparatively few smaller ones until near the margin of the hypodermal tissue previously described. Here they branch profusely and anastomose in a seemingly indiscriminate manner. The veinlets from one large vein unite with those from another so that the whole surface system is closely interwoven and connected. In the small veinlets the vascular elements become fewer and fewer, finally giving place to long narrow cells that seem to be transitional between the vascular tissue and that of the apple pulp.

*Chemical composition.*—The chemical composition of the apple varies greatly with the time of the year.

Pfeiffer (19) reported that crude fiber, ash, protein, sugar, acid, water, pectin, and dextrin all increased in the apple during growth.

Bigelow, Gore and Howard (20) found that the sugar content of winter apples increased from the time of the June drop till November 5, when the apples began to break down and become mealy. During this time the acid, as estimated on a total solids basis, was constantly decreasing. These changes in the sugar and acid content took place very rapidly in the latter half of June and early part of July. The starch content reached its maximum before the last of July and rapidly decreased after that time.

Morse (21) found that the most important change in the apple in the "after-ripening" process was the change of starch to sugar. Cold storage retarded this and other chemical changes but could not prevent them.

Otto (22) reported that when ripe apples were allowed to sweat in piles the starch was entirely converted into sugar in two or three weeks, the fruit thus becoming more valuable for cider-making.

Zschokke (6) reported that the tannin content decreased in the ripening process. He found that the tannin was located largely in the surface cells of the apple. He believed that apples owed their resistance to decay fungi much more to the chemical composition of the cell sap, especially to the tannic and malic acid content, than to any mechanical protection.

#### THE FRUIT PIT OF APPLES.

The writer finds that there are two distinct fruit spots that occur on New Hampshire apples. Some stages of either of these might be included under any of the previously mentioned descriptions. In the following pages one of these will be called the Fruit Pit and the other the Fruit Spot of the apple.

*Characteristics.*—In early stages of the Fruit Pit one finds numerous sunken areas from two to six millimeters in diameter on the surface of the apple. These depressions are somewhat hemispherical in shape and have the appearance of bruises. At this stage the spots are not brown and often show no difference in color from the surrounding surface of the apple. They may be a deeper red than the adjacent tissue when occurring on the colored portion of the apple and a darker green when on the lighter parts. Later they begin to take on a brown tint, but at first this seems to show through from rather deeply seated tissue and not to arise from any discoloration of the epidermal or immediately underlying cells. Sections of such spots show that this is the case, and that the browning and the shrinking of the cells occur in the pulp of the fruit and in the tissue that is transitional between it and the hypodermal parenchyma. Later the surface cells also become dark brown. The epidermis may be smooth and apparently unbroken in both early and late stages. As the disease advances spots situated near each other often become confluent, developing into one large spot. In all such cases examined it was found that the original spots were closely connected with one vascular branch.

*Internal browning of tissue.*—The surface spotting is often accompanied by browning of the tissue immediately surrounding the vascular bundles. Upon cutting such an apple one sees numerous apparently isolated brown spots. Further study shows that these are not isolated but are in reality continuous strands of brown tissue surrounding the vascular bundles. The portion of the vascular system that is most commonly affected is that lying within fifteen millimeters of the surface of the apple (Plate 3, Figure 3). The surface spots often occur without the internal browning and also the internal browning may occur un-



accompanied by any evident surface derangement. The affected tissue in both the surface and vascular regions may have a disagreeable and slightly bitter taste.

*Cause and occurrence.*—Microscopical examinations of fruit pits have given no indication of the presence of fungi or bacteria. Brown tissue from the surface pits and from the more deeply seated vascular regions has been transferred to various culture media but always without securing bacterial or fungous growth. Both the fruit pit and the internal browning are evidently abnormal physiological conditions. Their nature and location would indicate that they might be the result of some abnormal loss of water from the apple tissue.

The writer's observations give him no reason to conclude that the Fruit Pit is of common occurrence in New Hampshire. In the last three years, with the exception of a few very large Baldwins, he has seen it only as a result of improper storage. Frequent visits to the Boston markets for a study of spotted apples convince him that it is of rare occurrence on the fruit shipped to that city. In January, 1908, he made an unsuccessful search for specimens of Fruit Pit in the markets of Buffalo, Chicago, Toronto, and Montreal. He has recently had the privilege of making a study of the disease on apples from Maine, Michigan, and New York, from Ottawa, Canada, and from Cape Town, Africa. The specimens from all these sources had the characteristics previously given.

#### THE FRUIT SPOT OF APPLES.

*Occurrence and morphology.*—This disease is very common in New Hampshire and in the Boston markets one can often find barrels of apples shipped from various sections of New England in which fifty to ninety per cent. of the fruit is spotted. It occurs on almost every variety of apple but is worst on the Baldwins, and the following statements apply especially to the conditions as seen on that variety. The disease appears about the middle of August. At this time one may notice spots of a deeper red on the colored surface of the apple and of a darker green on the lighter portion. They are but slightly sunken if at all and there is no suggestion of a bruise (Plate 1, Figure 1). They usually occur at a lenticel but are sometimes covered with a smooth and apparently unbroken epidermis. The number on the blossom half of the apple is usually from two to ten times as great as that on the stem half. A part of this contrast might be accounted for by the difference in the number of lenticels on the two halves of the apple (see page 337), but

must be partly due to some other cause. As the season advances the spots become more prominent (Plate 1, Figure 2). On the red fruit surfaces they become more sunken and their color gradually changes from red to brown or black. At this time they bear a close resemblance to the earliest stages of Black Rot. Sections of the spots show that the hypodermal parenchyma is affected from the first. Only in late stages does the browning and shrinking extend to the large isodiametric cells of the apple tissue. On the green surface the spots may become sunken before harvest time, but the depressions are due to a lack of growth and not to any shrinking of the flesh. A minute black speck usually develops at the lenticel and smaller specks may often be seen at a radial distance of one to three millimeters from the first. A microscopic study of the underlying tissue shows that the cell walls of the hypodermal parenchyma and transitional tissue are abnormally thickened and that this thickening is especially prominent in certain groups of brown cells that underlie the surface specks (Plate 2, Figures 1, 2.) In the center of these brown cell-masses one often finds small pockets produced by the collapse of one or two cells. In cellar storage the red spots become badly browned and sunken. The green spots may take a similar course but in many cases there is no marked change in their surface appearance. Under such circumstances, however, one often finds that the disease is spreading deeper into the tissue and that a pocket is being developed as a result of the shrinking of the cells (Plate 2, Figure 3).

The development of the spots depends greatly upon seasonal and storage conditions. When the weather is damp and foggy during the last weeks before harvesting, the spots on the red fruit surfaces develop rapidly and become black and sunken before the fruit is removed from the tree. After gathering, the spots develop most rapidly on apples placed in boxes and barrels in cellar storage. On apples placed immediately in cold storage the spots make but little or no development. When apples are stored in a warm, dry place and wither rapidly, brown spots are not developed. On the withered fruit the green spots often stand above the surrounding portions, forming smooth green elevations that are in marked contrast with the yellow withered skin of the apple. This resistance to withering is probably due to the abnormal thickness of the cell walls in the tissue of the spots. Like the Fruit Pit the Fruit Spot is often accompanied by a browning of the vascular tissue. In late stages of the Fruit Spot one sometimes finds



minute elevations at the lenticels in the center of the brown sunken areas.

It would be difficult to decide from the earlier descriptions given in the bulletins of the New Hampshire station (17) whether the Fruit Spot or the Fruit Pit was under special observation. The descriptions are better if taken as applying to the two diseases than if considered as applying to either to the exclusion of the other. The spraying experiments (17) were undoubtedly made upon the Fruit Spot. So far as the writer has been able to learn, a distinction between these two diseases has never been made.

*An associated fungus.*—As a result of spraying experiments made in the summer of 1906 the writer obtained data that agreed with those of Lamson (17) as to the value of fungicides in preventing the spotting of apples. Such results could be explained only by assuming that the disease was of fungous origin or that Bordeaux had some remarkable and undescribed effect upon the skin of the apple. The former supposition seemed far the more probable. As an initial test of the hypothesis, blocks of browned tissue were removed from beneath the epidermis of the apple and placed in sterile culture media. Agar and gelatin cultures in which the nutrient substance was furnished by a decoction of beets, beans, beef, or apples were tried with little but negative results. The growths upon the different bouillons were too varied to give any indication of a common fungus. It was noticed, however, that after sections of spots had been left in water for a few days they were overgrown by a fungus and matted together. The fungus was always the same and always started from the center of the spots. As a result of these observations liquid media were given a more thorough trial. Browned tissue was transferred to sterile distilled water and in four or five days the blocks were fastened to the bottom of the test-tube or Petri dish. In fourteen days a fungous mass six to ten millimeters in diameter had developed. Similar results were obtained with various bouillons, and while the growth was quite unlike in the different media, transfers from one to another proved that the fungus was the same in all. It was also found that the fungus had not been obtained in the agar and gelatin cultures because their surfaces dried too quickly to give it time to develop. Placing the cultures in moist chambers remedied this trouble, but the development was slower than that in liquid cultures.

This constant occurrence of the same fungus in the diseased tissue suggested that it might be the cause of the trouble. In

view of the fact that fungi had been reported as being present in late stages of Fruit Spot, but had not been found to be present in earlier stages and again that no fungus had been reported as a factor in producing the trouble, one did not seem justified in drawing any conclusions until further studies had been made. It was important to determine whether the fungus is present in the earliest stages of the spots and whether it can be made to produce similar effects by artificial inoculation. Also, it was of interest to know from what sources the fungus can be obtained.

#### SOURCES FROM WHICH THE FUNGUS HAS BEEN OBTAINED.

In the investigation of this phase of the subject some sixty lots of apples were tested and as many as eight hundred separate cultures made. More than ninety per cent. of the cultures made from the green spots and about eighty per cent. of those made from the red spots gave a pure growth of the same fungus. More than fifty per cent. of the contaminations obtained from the red spots were due to *Sphaeropsis malorum*, Berk. Among the other fungi obtained in culture two species of *Penicillium*, an unidentified fungus and a particular species of bacteria seemed to be of more than accidental occurrence. The *Sphaeropsis*, however, was obtained from spots larger and darker than typical, and the other contaminations almost entirely from late stages of the spot. It was found that the fungus could be isolated from spots covered with a smooth and glaucous epidermis as well as from those having a lenticel in the center. The compound microscope revealed the fact, however, that the spots that seemed to be covered by an unbroken epidermis in reality had a stoma at the center.

In the summers of 1907 and 1908 spots were tested for the fungus from their earliest appearance. The same fungus was obtained from these earliest stages as was found in the later ones. In 1907 cultures of the fungus were obtained from Talman Sweets and Gravensteins on August 21, and from Baldwins on August 28. In 1907 cultures of the fungus were obtained from Talman Sweets shipped from Delaware. In these as in all other cases the tissue for inoculation was removed from beneath the epidermis by means of a sterilized knife. At this time the spots had little or no brown corky growth beneath them.

Within the past two years the fungus has been isolated from apples obtained from Delaware, New York, Pennsylvania, Michigan, Maine and Massachusetts, from Toronto and Montreal in Canada, and from the following points in New Hampshire: Web-

ster, Durham, Lee, Wilton, Madbury, Walpole, Packer's Falls, Barrington, Deerfield, Dover and Nashua. It has been obtained from the following varieties: Baldwin, Greening, Northern Spy, Talman Sweet, Red Canada, Red Astrachan, Canada Baldwin, Fall Pippin, Bellflower, Gravenstein, Grimes Golden, Russet, Porter, Snow, Wealthy, Ben Davis, and Mann, besides a half dozen different sorts of native fruit. The spots on most of the above varieties are similar to those already described. On the native varieties and on the Talman Sweets the green spots are more common and such brown spots as occur usually have a bright red margin. The appearance on the Talman Sweets is quite similar to that described by Clinton (15) under the name of Fruit Speck.

#### LABORATORY INOCULATIONS.

During the winter and spring of 1906-07 numerous inoculation experiments were made. The apples used in these experiments were first washed either in alcohol or in a five per cent. solution of formalin. Spores from pure cultures of the fungus were introduced beneath the epidermis by means of a sterile platinum needle. From four to twelve inoculations and an equal number of check punctures were made on each apple. These inoculated apples were placed in moist chambers to await developments. More than a hundred apples were treated in this manner. Most of these were Baldwins, but Yellow Transparents, Manns, Astrachans, Red Canadas, Greenings, and Porters were also used. Baldwins removed from the culture chambers after two weeks time usually showed little or no contrast between the inoculations and punctures. The same condition was sometimes found at the end of three weeks. After four weeks time there was always a marked contrast (Plate 3, Figure 2.) In the punctures the needle path looked practically as clear-cut and fresh as when first made. The inoculations showed on the surface of the apple as brown sunken spots. A study of the underlying tissue showed that the cells around the needle path had shrunk and collapsed, making a much larger opening than the original one. The tissue was browned for a radial distance of one to three millimeters (Plate 2, Figure 4.) When vascular bundles were near the needle path the browning extended several millimeters farther along their course than in other directions. Free-hand and microtome sections of the brown tissue of the inoculations showed that but one fungus was present. There was a good growth of this, and its characteristics and its relations to the host cells were the same as

are later described for the fungus in the pockets of the host tissue (see page 359). Upon transfer to culture media inoculation tissue gave pure cultures of the above-mentioned fungus.

The rate of development of the inoculation spots varied greatly with the apple. All of the spots on a particular apple might be as fully developed at the end of two weeks as those on another apple, inoculated on the same day, from the same test-tube and placed in the same moist chamber, were in four weeks. Notes were taken on the acidity, dryness, and texture of such apples, but no conclusion could be drawn as to the cause of the difference in susceptibility of the different apples of the same variety. The results upon other varieties were the same as on the Baldwin except that on the Greenings, Yellow Transparents, Astrachans, and Porters the browning of the spot developed more rapidly. This fact would suggest that a soft tissue and a readily available water-supply are favorable to the rapid development of the fungus.

Repeated attempts were made to inoculate ripe unspotted apples by spraying spores over their surface and by dropping them into solutions that were full of spores, also by placing small pieces of spore-bearing agar on the lenticels. The apples were placed in a moist chamber and left until decay began, but only negative results were obtained. The apples used were Porters and Baldwins.

The above tests were made after the apples had lain in storage for some time and it seemed possible that the results might have been different had the inoculations been made before the apples had passed thru their "after-ripening" stage. Accordingly in the fall of 1908 similar inoculations were made on apples soon after gathering. The apples used were Talman Sweets and Baldwins.

The possibility of inoculation from spores already on the fruit was partly prevented by thoroly washing the apples in 95 per cent. alcohol before using.

Every spot or suggestion of one was marked. The apples were sorted into two lots by selecting two apples as nearly alike as possible as to number of spots, ripeness and appearance in general and placing one in each pile. One of these lots was placed in glass jars and water to which spores had been added in large quantities poured over the apples. After standing a short time the spore-bearing water was poured out leaving the apples and the inside of the jars well covered with spores. The other lot was similarly treated except that no spores were added to the water. All of the jars were closed and placed in a cool, poorly

lighted place. On December 12th the apples were removed from the jars and notes taken on the increase in the number of spots. Apples that had no spots when placed in storage were as a rule still unspotted. The number of new spots on an apple that was originally spotted was approximately the same as the number of old ones. The average number of new spots was approximately the same on the inoculated as on the uninoculated apples. The experiment gave no proof that the spores applied to the apples had in any way affected them. The new spots from both the inoculated and uninoculated apples gave pure cultures of the fungus in question. These spots had probably been produced by spores that had gained entrance to the stomata and lenticels earlier in the year but had not made sufficient development at the time of gathering to cause spots on the fruit. The results seem to indicate that spores rarely gain entrance to the mature fruit, also that there is a great difference in the susceptibility of different apples.

#### FIELD WORK.

From the theoretical as well as the practical standpoint it was of interest to determine when and under what circumstances the fungus gained entrance to the apple and how this infection could be prevented. Spraying experiments made in the summer of 1906 furnished some suggestions in this matter.

*Fungicides.*—The Bordeaux mixture used in these experiments was made with five pounds each of lime and copper sulphate to fifty gallons of water. The "K. L. B. P." was similar Bordeaux with kerosene-limoid, as recommended by the Delaware Agricultural Experiment Station (23), containing 15 per cent. of kerosene. The plots consisted of five trees each. The following data were obtained by actual count of the gathered fruit:

Fungicide.	Time of spraying.	Percentage of picked apples spotted.
None		99.7
Bordeaux	May 30	83
"	May 30 and June 8	69
"	June 2 and June 8	72
"	June 2 and June 21	42
"	June 21	56
K. L. B. P.	May 30 and June 8	86
K. L. B. P.	May 30 and June 21	36

These results show that the application made on June 21 was more effective than any other and would suggest that infection usually takes place after that time.

In the summer of 1907 further tests as to the time of infection were made. The Bordeaux used was of the 3-2-50 for-



mula. As the fungus had been found to make a poor growth in alkaline solutions it was thought advisable to try the effect of lime as a spray. Five gallons of lime were added to each fifty gallons of water for this mixture. A resin-lime-solution was also used. It was prepared by adding five pounds of lime and five pounds of resin fish-oil soap to fifty gallons of water. As it was not known that the fungus was the primary cause of trouble, it seemed possible that some compound with little or no fungicidal value, but which would stick to the fruit as well as the Bordeaux, might have a hardening effect upon the epidermis and thus decrease the spotting. Accordingly calcium phosphate was formed as a precipitate by mixing dilute solutions of lime and sodium phosphate. Two and a half pounds of lime and five pounds of sodium phosphate were added to each fifty gallons of water. The plots consisted of five trees each. The following results were obtained by actual count of the spotted and unspotted apples on the trees at the time of gathering.

Mixture.	Time of spraying.	Percentage of picked apples spotted.
None		33.8
Bordeaux	June 17, June 25, and July 9	1.1
"	June 25 and July 9	1.5
"	July 9 and July 27	1.7
"	July 27	20.4
Lime	June 25 and July 9	16.7
Resin lime	June 25 and July 9	12.9
Calcium phosphate	June 25 and July 9	23.4

Spraying experiments similar to the above were made in the summer of 1908. The 15—10—50 lime-sulfur solution mentioned below was a self-boiled mixture containing fifteen pounds of lime and ten pounds of sulfur to each fifty gallons of water, and prepared according to the directions given in Circular No. 1, Bureau of Plant Industry (25.) The 9—6—50 solution was a similar mixture, having nine pounds of lime and six pounds of sulfur to each fifty gallons of water.

In the preparation of the K. L. B. mixture one pound of lime and one pound of sulfur were added to a gallon of water and the mixture boiled for thirty minutes. Seven and one-half gallons of kerosene and thirty pounds of lime were added to forty-one and one-half gallons of water and the mixture vigorously stirred and churned. The lime-sulfur solution was then added with further churning.

The resin lime mixture was the same as used the previous year. The strength of the Bordeaux is shown by the accompanying figures. Thus 2—3—50 Bordeaux has two pounds of copper sulfate and three pounds of lime to fifty gallons of water.



The first spraying was made June 15, the second June 26, the third July 15, the fourth August 1. The two orchards used were in the same field. The following results were obtained by actual count at the time of gathering:

Fungicide.	Applications.	Percentage of Picked Apples Spotted.
Results on Talman Sweets.		
Bordeaux, 2-3-50	2 and 3	11.8
None		62.1
Results on Baldwins, first orchard.		
Resin lime 5-5-50	1 and 2	36.1
L. S. Thomsen	1 and 2	54.3
L. S., 9-6-50	1 and 2	26.5
L. S., 15-10-50	1 and 2	18.7
Bordeaux, 2-3-50	1 and 2	22.2
None		62.1
Results on Baldwins, second orchard.		
K. L. S. Mixture	2 and 3	3.4
Bordeaux, 3-3-50	2 and 3	2.4
" 1-3-50	1 and 3	7.3
" 2-3-50	1 and 3	9.3
" "	1 and 2	8.3
" "	1 and 4	10.8
" "	4	47.2
" "	1, 2, 3 and 4	1.2
None		48.8

The second orchard had been well pruned while the first had not; it was composed of trees eighteen to twenty years old while the trees in the first were twenty-five to thirty years old. The difference in the amount of spot in the two orchards is probably due to these facts.

The results show the various lime sulfur solutions to be efficient in controlling the fruit spot, and that a 1—3—50 Bordeaux gives fair results. They also show that the disease may be largely prevented by two sprayings and that one of these may be made as late as July 15. The application made Aug. 1, evidently had little effect upon the spotting of the fruit.

The above data will be of further interest when viewed in connection with the results obtained in the orchard inoculation experiments.

The disease was not so serious as the preceding season, but the results were just as marked. While the lime was beneficial and the resin lime even more effective, it can be seen that both were far inferior to Bordeaux. The calcium phosphate was as evident on the foliage and fruit at the close of the season as the Bordeaux, but it seemed to have had but little effect upon the disease. If it had any effect upon the skin of the apple it could not be detected. A study of the results obtained from the use of Bordeaux shows that the application made on July 9 was more effective than any other. It also indicates that applications made as late as July 27 may materially reduce the disease.

*Inoculations.*—Throughout the summer of 1907 a large stock of liquid flask-cultures was kept on hand. The spores from these were added to water or to a one per cent. sugar solution and applied to the trees by means of a bucket-pump spraying outfit. The cultures used were approximately of the same age and the number of them added to a given quantity of water was always the same. The sprayings were all made between four and six o'clock in the afternoon. At each time two trees were thoroughly treated with water containing spores and two others with the sugar solution. These trees were given a second spraying two or three days later. The next week other trees were treated in the same manner. All of the trees were Baldwins. It was not considered necessary to spray the check trees with sterile water as the applications made to the other trees did not amount to more than an ordinary dew, and dews were common during the time of making the experiments. The data secured showed no contrast between the trees sprayed with water and those treated with the sugar solution. The results are given in the first of the tables below. The data were obtained by actual count of the apples at harvest time.

Only one bearing Baldwin tree was convenient to the laboratory. Inoculation experiments similar to those described above were made on the limbs of this tree. No sugar solution was used, however, and the spores were applied to the individual apple by means of an atomizer. Some half-dozen limbs bearing from six to twelve apples each were treated at a time. The limbs were selected from different portions of the tree so as to eliminate the factors of light and moisture as far as possible. Only one set of limbs was sprayed more than once and this was treated twice a week thruout the season. The sprayings were all made between four and six o'clock in the afternoon. The sprayed apples were not covered or protected in any way. Although the tree was large it is readily seen that plenty of opportunity must have been given for the spores to be carried by the wind from the inoculated apples to others near them. The results obtained from this experiment are given in the second table below.

## 1

Trees sprayed between :	Percentage of picked apples spotted.
July 5 and July 27.....	70.4
July 27 and August 10.....	43.5
August 10 and September 12..	38.9
Checks.....	33.8

Limbs sprayed between:	2	Average number of spots per apple.
July 2 and July 15 .....		15
July 15 and July 31 .....		13
July 31 and August 15 .....		11
July 2 and August 15 .....		28
Checks .....		9

The results varied greatly with the individual limb and tree. It was intended to compare the data obtained with the weather records but it was found at the close of the season that these were in an unsatisfactory condition and could not be relied upon.

Inoculation experiments similar to the above were carried on in the summer of 1908 and results equally as striking were obtained.

Each group of trees and each set of limbs was given six successive sprayings, the applications being made at intervals of two or three days. Canada Red and Baldwin trees were used. The following tables give the results obtained:

Baldwin trees sprayed between:	Percentage of picked apples spotted.
July 6 and July 19 .....	74.5
July 20 and August 2 .....	64.7
August 4 and August 14 .....	82.1
Checks .....	48.8

Limbs sprayed between:	Average number of spots per apple	
	Baldwin.	Canada Red.
July 8 and July 19 .....	21.7	12.9
July 20 and August 2 .....	66.7	100.4
August 4 and August 14 .....	28.	8.7
Checks .....	10.8	1.8

Other inoculation experiments were made by tying sheets of rubber closely around Baldwin and Canada Red apples and filling the bags thus formed with water that contained an abundance of spores. Check apples were similarly treated with water without the addition of the spores. These sacks were left on the apples three days and then removed late in the afternoon. The following table gives the average ratio of increase in number of spots per apple:

Date of Inoculation.	Ratio of increase in number of spots.	
	Baldwin.	Canada Red.
July 9 .....	0	3.4
July 14 .....	6.1	20.0
July 18 .....		12.0
July 29 .....	2.5	3.2
August 1 .....	15.0	3.0
August 8 .....	2.1	4.8
August 11 .....	3.4	1.3

Many of the treated apples had fallen before gathering time and the above averages were taken from a limited number of specimens. This probably accounts for the great variation in results. The individual results probably should not be given great weight, but the table as a whole shows the possibility of inoculation and is quite significant.

One would seem to be justified in concluding from the sets of data above that the month of July is the time when the majority of the infections naturally occur. In 1907 the first half of the month seems to have been most favorable for infections and in 1908 the last half.

On August 30, September 7, and September 12, 1907, attempts were made to inoculate Baldwins and Northern Spies by introducing the spores under the skin of the apple by means of a sterile platinum needle. Six inoculations and six punctures were made on each apple. The apples were left on the tree till gathering time, October 10. A hard corky growth developed around the needle path in both punctures and inoculations. No difference could be seen in the two at the time of gathering and no change in either was apparent in storage. Tissue from the inoculations when transferred to culture media either gave no growth or a growth of bacteria. The fungus was evidently unable to develop in the column of cider that must have filled the needle path after inoculation. This fact is in agreement with data given later showing that the fungus did not develop on Baldwin cider made from apples gathered the last of August, even when this was diluted to one-third its original strength.

#### CHARACTERISTICS OF THE FUNGUS.

In order to learn as much as possible of the nature and identity of the fungus it has been grown upon a large number of culture media. Except where otherwise stated the decoctions used were prepared in the manner prescribed in bacteriological and pathological texts.

In all liquid cultures, except with a few very unfavorable media, the fungus began its growth in the bottom and on the sides of the vessel. After four or five days the entire surface that was under water was thickly dotted with minute colonies. (This was not true of the sides of Erlenmeyer flasks nor of the upper wall of a slanting test-tube.) The number of colonies was dependent upon the amount of surface and the number of spores introduced rather than upon the quantity of solution. These colonies soon developed into hemispherical gelatinous

masses that could not be readily crushed when placed on a slide under a cover-glass because of the ease with which they slid from between the glass surfaces (Plate 3, Figure 4.) A microscopic study of the material showed that its gelatinous nature was due to the fact that the hyphae upon coming in contact with each other became fastened together. This attachment often extended to a breaking down of the walls between the hyphae and the merging of two cells into one. The result was a peculiarly anastomosed fungous mass. Spores were most abundant on the surface of these masses but were produced thruout the colony. They were hyaline, consisted of from one to five cells and were from 2 to 3 microns wide by 20 to 60 microns long. The hyphae were septate and about 3 microns in diameter. The spores were cut off from the tip of knob-like projections on the side of the hyphae as described below for the agar cultures. A few days later these colonies would go to pieces and a growth would soon begin to form on the surface of the liquid. This growth was light-colored at first and of uniform texture throughout, but later had a very definite zonation both as to color and structure (Plate 5, Figure 2). On the surface was a layer of hyaline conidiophores arising from a zone of vertical brown hyphae that formed the upper margin of a dense black stromatic layer. The hyphae of the stroma were thick-walled, abundantly septate, and from 3 to 6 microns in diameter. Beneath it was a less compact layer composed of a mixture of coarse and fine threads. In some cases there was a series of such zones as have just been described. This may have been due to the fact that the liquid had been left on the top of the stroma when examinations of the flask were made. In a five months old flask culture it was noticed that numerous, somewhat hemispherical elevations had developed on the surface of the stroma (Plate 5, Figure 1.) An examination of cross sections of these showed that numerous thimble-shaped cavities had developed on their surfaces and that where these were present the layer of conidiophores was wanting. These cavities were bordered by rather dense layers of mycelium and contained parallel erect hyphae with thinner-walled and almost isodiametric cells that in some cases gave a suggestion of presporogenous tissue.

In agar cultures the conidia were produced beneath the surface of the agar. One spore would be produced and pushed aside to give way to a second, and this followed by a third and so on indefinitely (Plate 7, Figure 2.) In young cultures nearly all of the mycelium was beneath the agar, later a mass of coarse aerial hyphae developed (Plate 4, Figure 5). In such



cases a black stromatic layer was formed just beneath the surface of the agar.

Chlamydo-spores were common in all old cultures.

Conidia germinated rapidly in hanging-drop cultures (Plate 6, Figures 1, 2, 3). Under similar conditions chlamydo-spores germinated as shown in (Plate 7, Figure 4). Each cell of the stromatic mass in old cultures seemed to have the power to send out hyphae when transferred to a fresh medium (Plate 7, Figures 5, 6).

The conidia from very old cultures did not germinate but the chlamydo-spores and thick-walled hyphae retained their vitality a long time. Germination was secured from chlamydo-spores in an agar culture that was twenty-six weeks old and in which the medium had been hard and dry for more than five months.

The fungus developed as well in cultures at a temperature of 15 degrees as at 20 degrees, but made a poor growth at 30 degrees. It was killed by an exposure for five days to a temperature of 37 degrees. It was evidently not injured by prolonged exposure to low temperatures, as it was repeatedly isolated from apples which had been in cold storage for several months. It was also obtained in culture from an apple which had been exposed for eight days to a temperature varying from—28 degrees to—6 degrees C.

#### RELATION OF THE FUNGUS TO NUTRIENT MEDIA.

The fungus grew best on acid media and was very sensitive to sugar in culture solutions. In most culture media that lacked sugar the fungous growth was white or pink, but where sugar was present as the principal ingredient it was olive or black. The solution given below was found to give a very satisfactory growth of the fungus and was used for all stock cultures. For the sake of convenience it will be referred to hereafter as solution A.

Glucose or sucrose.....	10 grams
Apple bouillon.....	25 c.c.
Sodium chloride.....	1 gram
Liebig beef-extract.....	1 gram
Peptone.....	2 grams
Water.....	1975 c.c.

The following notes give some of the characteristics of the fungus in various culture media:

*In water.*—Blocks of infected apple tissue two or three millimeters in diameter gave a good growth of the fungus when



dropped into sterile tap or distilled water. In less than a week the fungus had fastened the blocks to the bottom of the test tube and later spores were produced in limited numbers. The hyphae were about 2 microns in diameter, hyaline, and sparingly septate. Spores germinated readily in distilled water, producing hyphae several hundred microns long in a few days.

*In peptone beef bouillon.*—In this medium the growth was a pinkish white, beginning as colonies on the walls of the flask and later forming a shiny pink layer on the surface of the liquid. There was a fair production of spores. The hyphae were coarser and shorter than those described above.

*In glucose bouillon.*—Olive colonies developed on the side of the test-tube, followed by a dark olive growth on the surface. Spores were produced in abundance and were always hyaline. The hyphae were thicker-walled and more abundantly septate than in other media.

*In solution A* (see above).—The growth was more rapid and the spores were produced in greater abundance than in glucose bouillon. The hyphae were hyaline except in the surface growth of very old cultures.

*In milk.*—The fungus developed only on the surface of the milk. After seven days a slimy pink band of fungous growth would be seen on the walls of the test-tube and a layer of brown whey two to five millimeters deep would be found on the top of the milk. The remainder of the medium was unchanged and the whey was separated from the milk by means of a film-like layer of curd. At the end of fourteen days the whey had a depth of ten to fifteen millimeters and in three weeks had often nearly reached the bottom of the test-tube. The layer of curd always separated the milk from the whey and in old cultures formed a solid white mass several millimeters deep in the bottom of the tube. Cultures in fermentation-tubes showed that no gas was produced. The hyphae as developed in milk were short, thick, and much branched. Spores often produced other spores by a sort of budding process.

*In peptone potato bouillon.*—The fungus made a good growth. No browning of the solution was evident in nineteen days but at the end of two months it was browned to a depth of two centimeters and later was browned thruout.

*In peptone corn-starch bouillon.*—The results were exactly as obtained in peptone potato bouillon except that the browning developed more rapidly.

*In potato-starch bouillon.*—The fungus made a fair growth. The hyphae were hyaline. The solution was not browned.

*In corn-starch bouillon.*—The growth was like that in potato-starch bouillon except that in old cultures the hyphae became olive.

*In apple bouillon.*—Though the tubes were repeatedly inoculated, the fungus did not develop. The bouillon was made from Baldwins gathered the last of August.

*On apple cylinders in water.*—The fungus made a fair growth. The hyphae were coarse and of a dark olive color. But few spores were produced. The apple tissue became brown in old cultures, a thing which did not happen in the check-tubes.



FIGURE 13. Stab culture of *Cylindrosporium Pomi* on beef bouillon gelatin.

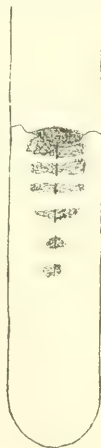


FIGURE 14. Stab culture of *Cylindrosporium Pomi* on beet agar.

*On potato cylinders in water.*—A black slime developed, upon the surface of which were tufts of hyaline hyphae. The spore production was much like that obtained in milk.

*On beef bouillon gelatin.*—The development was very slow when surface inoculations were made. Liquefaction was scarcely evident in seven days but developed more rapidly after that time. It was crateriform in character. From three to eight weeks were required for complete liquefaction. In old cultures the liquid was slightly browned. In stab cultures the growth was absorbent (Figure 13).

*On beet bouillon gelatin.*—The hyphae were darker than those in the beef gelatin and the liquefied gelatin was brown from the first.

*On apple bouillon gelatin.*—The development was slower than in other gelatins. The fungous mass was olive-black. The gelatin was liquefied and browned.

*In beef bouillon agar.*—The surface growth was umbonate. It was pink in color and had the appearance of a bacterial culture. Later the growth sometimes became darker at the margins. The hyphae were abundantly septate and the cells often swollen to circular form and to several times their usual width. Typical spores were not produced.

*On glycerin agar.*—The appearance of the colonies was similar to those on beef agar but they soon turned to an olive color. The hyphae appeared normal and spores were produced in abundance. But few aerial hyphae developed.

*On maltose agar.*—The colonies were pink at first but later were covered with hyaline aerial hyphae. The development was slow and but few spores were produced.

*On beet agar.*—In stab cultures the growth was umbonate, and arborescent (Figure 14). The hyphae were hyaline with the exception of an olive mass on the surface in the center of the colony. Spores were produced beneath the agar.

*On solution A agar.*—The growth was entirely beneath the agar at first. Later an olive stromatic mass developed at the surface and from this were produced numerous aerial hyphae (Plate 4, Figure 5). The spores were abundant and were produced beneath the surface.

*Miscellaneous media.*—The fungus has been grown on various other media and under various conditions in an effort to produce other fruiting forms. Among the substances used were rice, ground whole wheat, hominy, peptone, corn stalks, and various phosphate and potash solutions. On rice and hominy the growth was white on the surface but olive beneath. On ground whole wheat it was black thruout and gradually turned the wheat to a deep brown. In all peptone mixtures the culture medium was browned, the greater concentrations being changed most in color. Sodium ammonium phosphate added to a sugar solution caused a slimy pink growth to develop instead of the usual coarse olive fungus. This was not true of potassium phosphate.

The above culture notes show that while the fungus is responsive to changes in food material it is able to make some sort of growth on almost any medium.

*Acidity. Enzymes.*—Since the acidity of the cell-contents of the apple had been considered an important factor in the production of the "Stippen," it was thought advisable to test whether the fungus in question increased or decreased the acidity of culture media. Thirty 100 c.c. flasks were thoroughly cleaned as for physiological culture work and 50 c.c. of solution A added to each. After sterilization twenty of these were inoculated with the fungus. All thirty of the flasks were kept under the same conditions for sixteen days. At this time the acidity of the inoculated flasks and those not inoculated was determined by titrations. The large amount of sugar present reduced the sensitiveness of the indicator to such an extent that no definite results were obtained. There had at least been no marked change in acidity.

Neutral litmus milk-tubes were inoculated and were watched for any indication of acidity. The lavender color disappeared only to give place to the brown of the whey.

Some culture material which had originally been solution A but which had had the fungus\*growing on it for more than five months, produced but an extremely scant growth after sterilization and reinoculation. Tests were made to determine whether the reduction in growth was due to the production of some harmful substance or to lack of food material. 25 c.c. of this used solution were placed in each of fourteen 100 c.c. flasks. To two of these was added as much of each of the original food materials as had been added to an equal quantity of water in the beginning. In another two the peptone content was increased as described above but the solution left otherwise unchanged. The other food constituents were added to other flasks in a similar manner, and two flasks were left unchanged as controls. The flasks were all inoculated with the usual fungus. The ones to which all the original constituents had been added gave a luxuriant growth of the fungus. The flasks to which sugar had been added came next in amount of development and those in which the apple content had been increased came third. The addition of peptone increased the growth but the flasks to which beef extract and sodium chloride had been added gave no better development of the fungus than was obtained in the controls. These results would suggest that the fungus failed to make the usual development in old culture media because of lack of food material rather than from any harmful compound produced, and also that the acidity of the solution must have been decreased by the growth of the fungus. Beef extract and sodium chloride

were evidently not needed by the fungus in the quantity in which they were added to solution A.

Efforts were made to determine whether the browning that accompanied the fungus in the apple tissue and also in various other culture media was due to an enzyme or other product of the fungus. A part of the old solution A, previously described was sterilized and strips of sterile uncooked apple tissue dropped into it. Strips of apple were similarly placed in new solution A. After three weeks the tissue was unaffected in both of these. This used culture solution was also added to tubes of milk but no change in color was apparent. Some of the old culture solution was passed through a Chamberland filter and its effects upon apple tissue tested, but with only negative results.

The toxic effect of malic acid and tannin on the fungus was tested in Van Tieghem cells. Germination was entirely inhibited by a .5 normal solution of malic acid and greatly retarded by .125 *n* solution. The fungus made a fair growth in the latter solution. With tannic acid, germination was inhibited by a .025 *n* solution and only an abnormal growth was made in .0125 *n* solution. The fungus gave a fair growth in .00625 *n* solution.

According to Alwood and Davidson (24), ripe Baldwins have .039 gram of tannin and .68 gram of acid as malic to each 100 grams of juice from the ripe fruit, *i. e.*, the juice would be about .002 *n* solution of tannin and about a .1 *n* solution of malic acid. These data agree with the fact that the fungus makes a fair growth on ripe apples. They show that any large increase in the acidity of the apple would prevent the development of the fungus in a cider culture. The tannin in the surface zone of the apple is probably greater than the above figures would indicate, as tests made by the writer as well as the work of Zschokke (6) show that the tannin content in the hypodermal parenchyma is much greater than in the more deeply seated tissue. It is interesting to note in connection with the extreme sensitiveness of the fruit spot fungus to tannin that Alwood and Davidson (24) found the Baldwin apple to be comparatively low in tannin content.

#### THE RELATION OF THE FUNGUS TO THE HOST.

In connection with the other work upon the disease a microscopic study was made of the fungus as found in the tissue of the spots. In the preparation of material several killing agents were used, among these were absolute alcohol, various strengths of chrome-acetic, weak Flemming, Carnoy's fluid, picric and picro-acetic. The last two were found to be far the most satisfactory. Their superiority lay in the fact that they did not cause the epi-



dermal and closely related cells to become so hard and brittle as the others did. Various contrast stains were tried on the tissue but none found more satisfactory than Delafield's haematoxylin followed by erythrosin. Both the apple tissue and the older threads of the fungus held the haematoxylin quite persistently. The best results were obtained by staining fifteen or twenty minutes in haematoxylin, washing in acid alcohol until the stain had almost disappeared, transferring to water and then to erythrosin and leaving the slide in the latter stain for several hours. Erythrosin gave fair results when used alone. Free-hand sections were found very serviceable but serial microtome sections were generally used. Various thicknesses of sections were tried. Thin ones were best for a study of the stomata and lenticels, but sections 40 to 60 microns thick were found more satisfactory in tracing the mycelium of the fungus. This is not surprising when we bear in mind the large size of the apple cells and extreme fineness of the mycelium.

Every form and stage of the disease was studied. More than a hundred spots were sectioned and the fungus was found in every spot. This was true of the spots located at stomata and covered by a smooth epidermis as well as of those situated at the lenticels. In the younger stages the fungus had made very scant growth. In several cases it was actually identified in but one or two places in the entire series of sections and these possibly a millimeter or more apart. The threads were hyaline, granular, and apparently non-septate. They were extremely fine, in some cases being less than 1 micron in diameter. They had exactly the same appearance in these young stages of spots as when grown in extremely dilute solutions.

A study of the later stages showed that the fungus had accompanied the browning of the tissue in its spread. In the lenticels of the red spots one sometimes found a band of thick-walled promiscuously arranged cells passing through the organized layers of the lenticel, thus connecting the browned tissue beneath with the break in the epidermis above (Plate 6, Figure 4.) In such cases the fungus was present in both the band of cells and the more deeply seated shrunken tissue. In the green spots the fungus was found both in the groups of brown cells beneath the lenticel and in those a short distance from it (page 341). In many cases it seemed to have remained encysted in the center of these groups of thick-walled cells (Plate 2, Figure 1, 2). In others it had broken through them, spreading deeper into the tissue, browning and killing the cells along its course (Plate 2, Figure 3). In no case



was the fungus definitely traced from one of these pockets to another. Careful search was made for hyphae that had penetrated the cell-walls but none were found. In some cases they seemed at first sight to be within the cells, but a closer observation showed that the cells had collapsed and that the hyphae were in the cavity they had left. The mycelium in the pockets of the host tissue was coarse, septate, thick-walled, and brown, such as was often obtained in the stromatic layers of cultures. From these coarse threads arose fine hyaline apparently non-septate ones which spread out into the apple tissue. Chlamydespores were common on the coarse hyphae but conidia were never found within the apple tissue.

As was previously mentioned spots that had become much enlarged, sunken, and browned sometimes had a minute elevation in the center (page 342). Sections through these showed that the epidermis had been raised in this manner through the agency of a fungous mass beneath. A dense stroma from 60 to 100 microns in diameter and about 50 microns deep, occupied a pocket beneath the lenticel or stoma. Equally dense layers extended laterally from this between the host cells for a radial distance of 100 to 400 microns. The stromatic mass was hyaline or of a yellowish tint and was composed of closely woven, septate, thick-walled hyphae that had a diameter of about 5 microns. In spots in which the fungus had not yet broken through the epidermis a somewhat conical fungous mass that seemed to be composed of fine granular hyaline threads arose from the upper surface of the stroma (Plate 4, Figure 2.) In older stages this had been forced through the epidermis as a layer of erect hyaline sporophores (Plate 4, Figures 1 and 3.) The sporophores were extremely thick-walled, usually septate, and either branched or unbranched. The conidia were produced in a manner similar to that already described for the fungus in cultures (Plate 7, Figures 1 and 2.) They were hyaline, from one-to-five-celled, 2 to 2.5 microns in diameter, 15 to 70 microns long, often larger at the basal than at the free end, and were variously curved and contorted.

#### IDENTITY OF THE FUNGUS.

The descriptions of the previous pages together with the various figures to which references have been given furnish a fairly complete morphology of the fungus in question. In young stages of fruit spots and in all dilute solutions the hyphae are hyaline, granular, apparently non-septate, and are from 1 to 2 microns in diameter. In more concentrated solutions they are usually

granular and hyaline, have a diameter of 2 to 8 microns and are broken up into cells having a length of 20 to 100 microns. Stromatic hyphae and those in the pockets of the host tissue are various shades of yellow and brown in color and are composed of thick-walled, somewhat barrel-shaped cells about 5 microns in diameter and 6 to 20 microns in length. Chlamydospores are a common accompaniment of these coarse threads. They are brown, thick-walled and have a diameter of from 4 to 6 microns. In young liquid and agar cultures conidia are produced from knob-like projections on the side of long, branching, septate, apparently vegetative hyphae. Many conidia are produced from a single one of these projections. The conidia are hyaline, granular, one to five-celled, from 2 to 2.5 microns in diameter and from 15 to 80 microns in length. In outline they are straight, curved, or sigmoid. They germinate rapidly, sending out one or more hyphae from each cell. In some media the germinating spores produce other spores directly without the development of a mycelium. In old cultures a stroma is produced from which arises a layer of hyaline conidiophores. They are from 20 to 60 microns long and differ from the vegetative hyphae but little save in a reduction in length and branching. The conidia and their manner of production are similar to that described above. Pustule-like cavities having no special peridium develop at stomata and lenticels beneath the epidermis. Later they rupture the epidermis, exposing a layer of hyaline, septate, sparingly branched conidiophores. The conidia are produced from knob-like projections on the conidiophore and have the characteristics given above for spores produced in culture media.

The structures of the pustules and of the spores places the fungus in the genus *Cylindrosporium*. Of the species in this genus enumerated in Saccardo, it bears closest resemblance to *Cylindrosporium Ranunculi* (Bon) Sacc. This fungus was isolated from leaves of *Ranunculus aeris* and *Ranunculus bulbosus* in Italy. The writer is not inclined to consider the two fungi identical. For the Fruit Spot fungus he suggests the name *Cylindrosporium Pomi*.

*Cylindrosporium Pomi* Brooks, sp. nov.—Acervulis pallidis, subeffusis, primo subepidermicis, dein erumpenti-liberis. Conidiis hyalinis, granulosis, filiformibus, rectis vel flexuosis, 15—80 microns X 2—25 microns. In fructu *Mali Mali* (L.) Britton, in America Boreali.

## SUMMARY AND CONCLUSIONS.

The writer considers that the facts and indications given justify the following conclusions:

1. The Fruit Spot of New Hampshire apples is due to a parasitic fungus, *Cylindrosporium Pomi* Brooks.

2. The fungus gains entrance to the apple in July or early August, a time when the stomata are being torn open and the protecting layers of the lenticels are not yet formed, a season when the metabolism of the apple is extremely great and the transpiration stream necessarily large.

3. The fungus makes its way into the intercellular spaces beneath the stomata and between the cells of the surface zone obtaining the substance necessary for its existence from the transpiration stream and from the rapidly maturing host cells.

4. If the fruit is attacked before the cells have lost their power to respond to external stimuli the fungus is soon partially surrounded by a layer of brown, thick-walled cells which may serve as a barrier to its further nutrition. In such cases the results are not altogether unlike those obtained from a minute puncture or an insect sting.

5. If, however, the fungus attacks the host cells when they are nearly mature, it finds conditions more favorable for its development, because the cell sap furnishes more satisfactory food material and the cells are at the same time unable to respond to its presence. The result is a more vigorous development of the fungus and a rapid browning and drying of the host tissue.

6. The chlamydospores and sclerotial masses of the fungus are the probable agencies in carrying the disease through the winter.

7. Conidia have not been found on the host in the fall. They probably develop from sclerotia and pycnidia in the following spring on apples that have lain on the ground over the winter, and thus become the agency in starting the disease the next season.

8. Spraying with Bordeaux is a preventive for the disease. Applications made late in June or early in July are as effective as those made earlier in the season.

9. By his references to the work reported from other stations the writer would not be understood to imply that the disease here under special consideration is *identical* with that described from any other section. However, he does not find anything in some of these reports to show that the Fruit Spot which is com-

men in New Hampshire *may* not sometimes have been included along with the Fruit Pit in these descriptions. Further, this study leads the writer to the conclusion that the fact that particular pathological conditions may originate without the presence of any foreign agency, should not be taken as proof that very similar results may not be due to the presence of a parasitic fungus in the host tissue.

The writer wishes to acknowledge his indebtedness to Prof. H. H. Whetzel of Cornell University, Prof. W. J. Morse of the Agricultural Experiment Station of Maine, Dr. J. B. Dandeno of Michigan State Agricultural College, Prof. H. R. Fulton of Pennsylvania State College, Prof. W. T. Macoun of the Central Experimental Farm, Ottawa, Canada, and Prof. C. P. Lounsbury of the Department of Agriculture, Cape Town Africa, for specimens of spotted fruit.

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#### Explanation of Plates 1—7.

##### PLATE 1.

FIG. 1. Baldwin showing young stages of the Fruit Spot.

FIG. 2. Baldwin showing later stages of the Spot.

##### PLATE 2.

FIGS. 1 and 2. Section through green spots of Baldwins showing a browning in the surface cells and pockets in the adjacent tissue. The fungus can be plainly seen in some of the largest pockets.

FIG. 3. Section through a green spot of a badly withered Baldwin, showing the thick-walled cells of the surface zone from which has later extended the large mass of shrunken brown cells beneath. The fungus can be seen in the pockets in this shrunken tissue.

FIG. 4. A cross-section of a thirty-four days' old inoculation on a Baldwin. The mycelium may be seen in the needle path and also closely pressed against the walls of the withering cells.

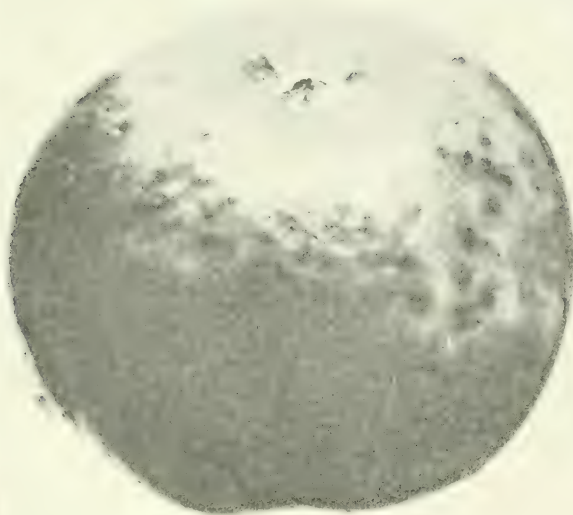
##### PLATE 3.

FIG. 1. A cross-section of an apple to show the location of the large bands of conducting tissue.

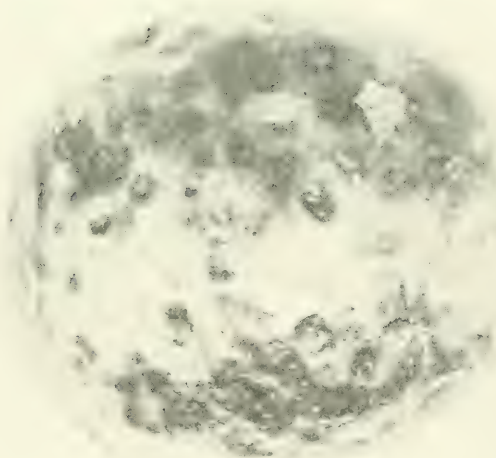
FIG. 2. Inoculations and punctures from a Baldwin after fifty days. The two at the right are inoculations.

FIG. 3. A section of an apple of which the tissue in the region of the vascular system is browned.





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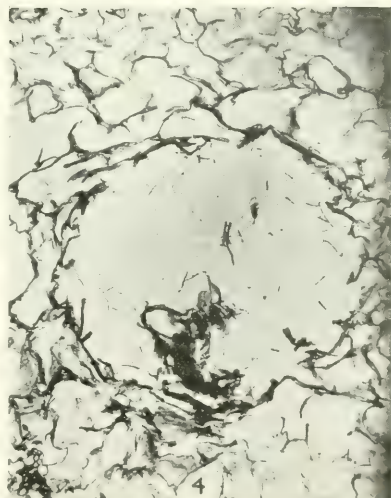
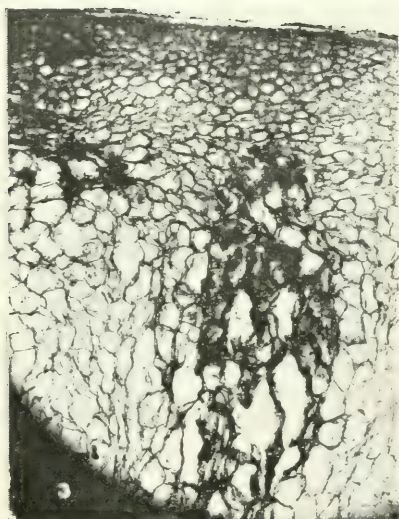
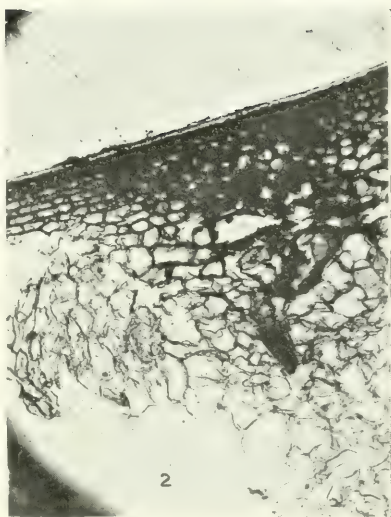


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THE FRUIT SPOT OF APPLES.

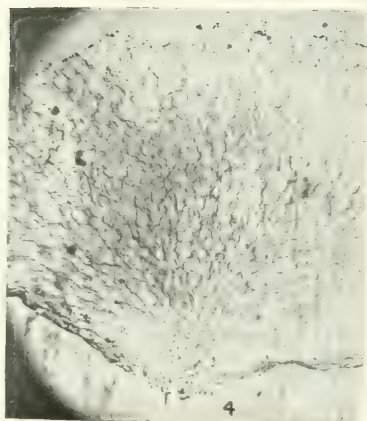
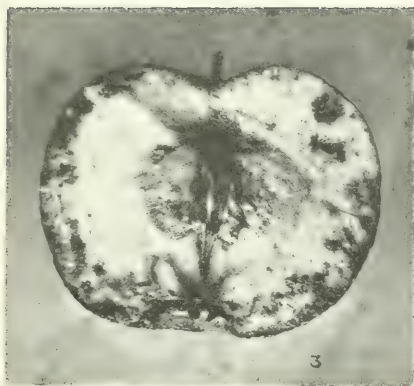
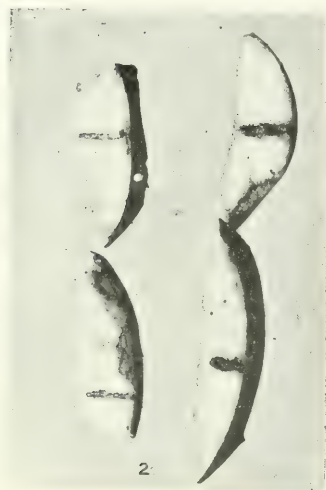






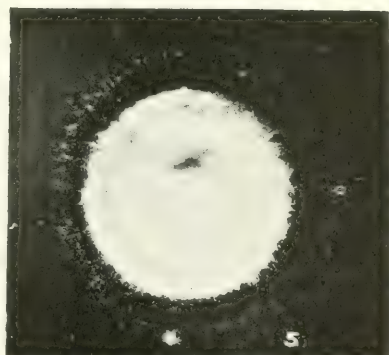
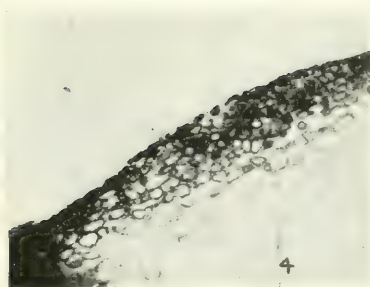
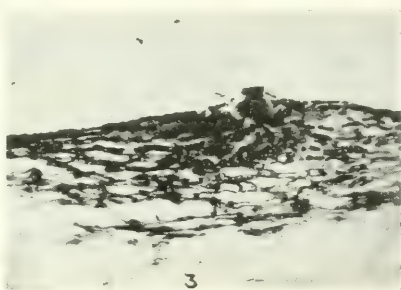
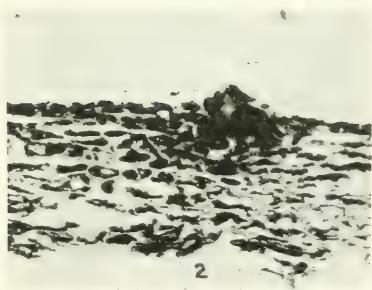
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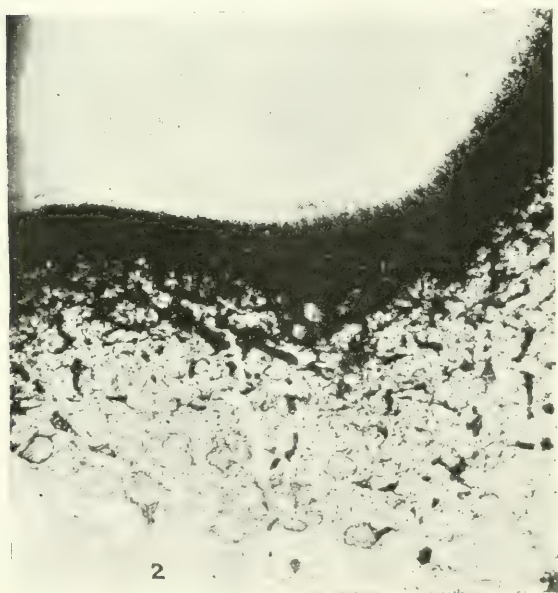
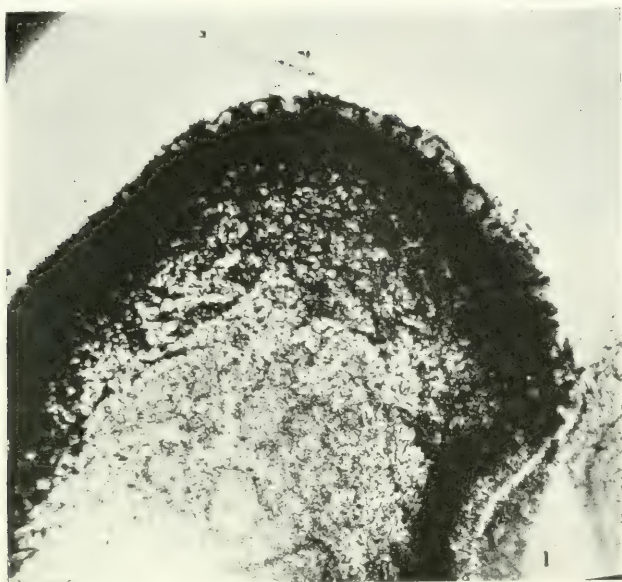




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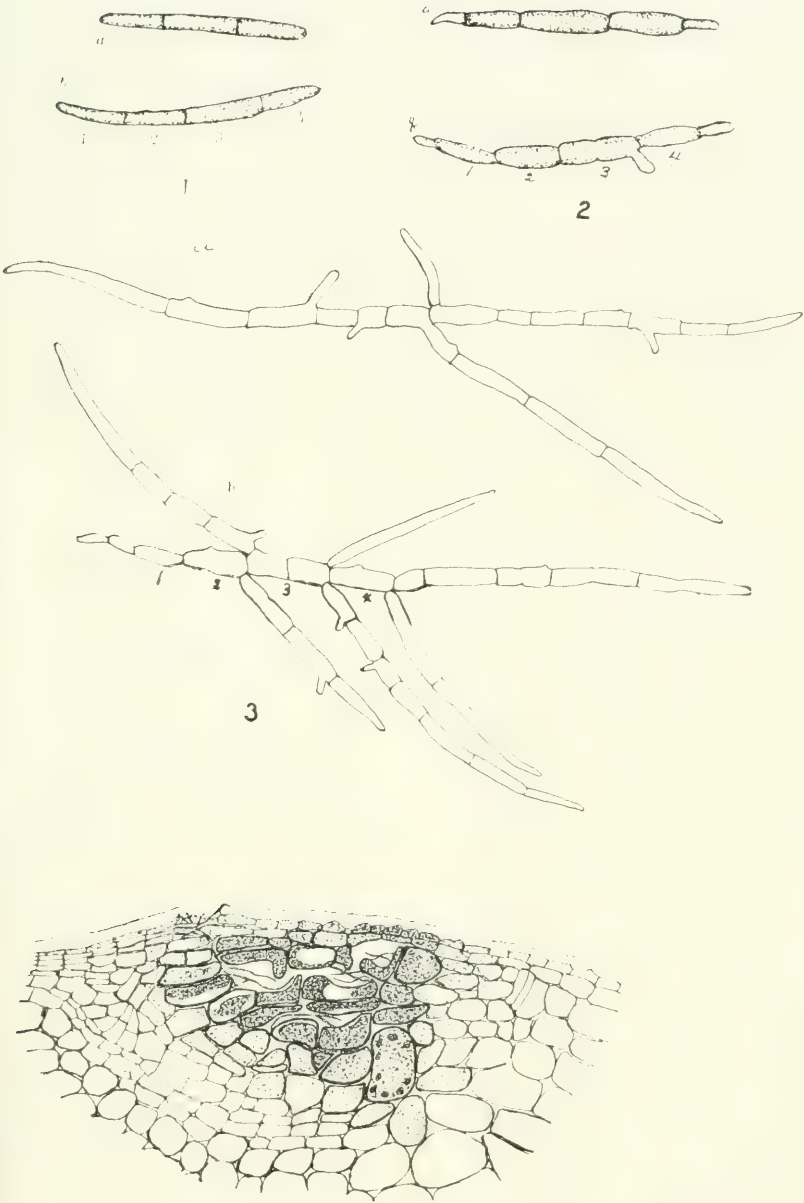






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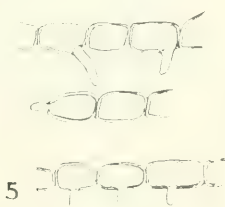
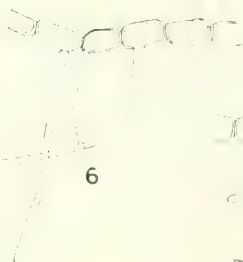
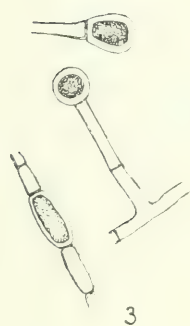
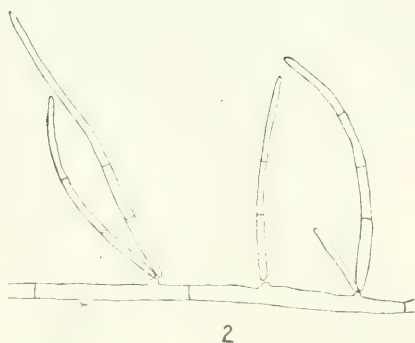




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THE FRUIT SPOT OF APPLES.





THE FRUIT SPOT OF APPLES.





FIG. 4. A section of a typical colony from the walls of a ten days' old culture of solution A. The lower side as shown in the plate was attached to the wall of the test tube.

## PLATE 4.

FIG. 1. A sketch of a spot showing the developing stroma and sporophores.

FIG. 2. A late stage of the Fruit Spot, showing the stromatic layer of the fungus with a conical mass of immature sporophores above it.

FIG. 3. A later stage of the spot showing the stroma, the shrunken tissue beneath, and the sporophores pushing through the lenticel above.

FIG. 4. A lenticel of an apple with normal tissue beneath it.

FIG. 5. Fungus as grown in agar Petri cultures.

## PLATE 5.

FIG. 1. A section of one of the minute elevations from the stroma of a five month's old flask culture. The pustule-like cavities are shown in the upper portion.

FIG. 2. A cross-section of a stroma from a liquid flask culture showing the layer of conidia and conidiophores.

## PLATE 6.

FIG. 1. Spores from cultures in solution A.

FIG. 2. The same spores after remaining twenty-one hours in Van Tieghem cells.

FIG. 3. The same spores after forty-two hours.

FIG. 4. A drawing of a section through an early stage of a fruit spot.

## PLATE 7.

FIG. 1. Conidia from a pustule such as is shown in FIG. 3, PLATE 32.

FIG. 2. Spore production in solution A agar after four days.

FIG. 3. Chlamydospores from an old culture.

FIG. 4. Germinating chlamydospores.

FIG. 5. Olive-brown hyphae from a six week's old liquid culture after one day in a Van Tieghem cell.

FIG. 6. A similar hypha after two days in a Van Tieghem cell.

FIG. 7. A sketch of a portion of the vascular system of an apple.

## APPLE LEAF SPOT.

ISAAC M. LEWIS.

The disease known as "leaf-spot" or brown spot of apple leaves is of general occurrence throughout the entire state of New Hampshire and its importance as an agent of destruction has doubtless been greatly underestimated. The disease first makes its appearance on the young leaves shortly after they unfold from the bud in the early spring and may be readily recognized by the presence of small purple areas which, as growth progresses, reach a diameter of from one-eighth to one-half inch. The spots are quite uniformly circular in outline and the color soon

changes to a yellowish brown. The margins are somewhat elevated, giving to the spot a sunken appearance. (Fig. 1, Plate 9.) The infection spreads throughout the spring and early summer and in many cases the leaf becomes densely covered with spots; each spot retaining about the same size and color until mid-summer. As the spots grow older, secondary growth takes place from the central affected area and a somewhat irregular blotch is formed in which the outline of the original spot can always be recognized. It often happens that several of these areas become confluent and thus the greater part of the leaf may become affected (Fig. 2, Plate 9.) The color of these older areas is generally somewhat grayish. Leaves so affected fall from the trees much earlier than under normal conditions and their working efficiency is always greatly reduced by the middle of the summer, the season at which they should be most active in supplying food for ripening the fruit and developing the buds for the succeeding year. Trees so robbed of their foliage from year to year, must eventually become greatly impaired in their vigor and finally succumb to premature destruction.

#### CAUSE OF LEAF-SPOT.

The cause of leaf-spot has occasioned no little difficulty and while it seems quite probable that different investigators have been dealing with the same spot various conflicting accounts have been offered as to its cause. The majority of investigators since 1892, the time at which the disease was first reported from Virginia by Alwood, basing their conclusions rather on the ease with which the disease is controlled by spraying than by careful inoculation experiments, have regarded the disease as of fungous origin. In this opinion, however, all investigators have not concurred. Stewart and Eustace regarded the spots as due to atmospheric influences, or spray injuries and gave it as their opinion that the various fungi present in the affected tissue were saprophytes and not primarily concerned with causing the disease. Stone and Smith 1903 regarded frost as the primary agency in the cause of spots as they occurred in Massachusetts. These explanations of the non-fungous origin of the disease are brought strongly into question by the results of various spray experiments conducted during the progress of this investigation and cited in a later paragraph.

The investigators who have decided in favor of the fungous origin of the disturbance have not agreed as to the specific fungus which is of primary importance in its cause. This difficulty is

occasioned by the fact that no one fungus is found to fruit consistently and to the exclusion of others on the affected areas.

Lamson in 1899 decided that the fungus *Phyllosticta pirina* caused the "brown spot" of apple leaves in New Hampshire and Corbett reached a similar conclusion in West Virginia.

Other investigators have reported the disease as being caused primarily by *Phyllosticta limitata*, while still others regard *Sphaeropsis Malorum* Berk. as the specified cause.

Doubtless the most comprehensive piece of research attempted to determine the exact fungus responsible for the infection was that carried on by Scott and Rorer in connection with demonstration spraying work in the Ozarks in 1907. They found that contrary to general belief the fungus *Sphaeropsis malorum* is the cause of the disease that occurs throughout the middle west. The other fungi which are found to fruit on the affected areas they regard as Saprophytes, which are of only secondary importance.

The number of fungi reported as fruiting on these spots has been increased during the past year by Hartley of Minnesota and others. A complete list of the species reported embraces the following species: *Coryneum foliicolum*, *Coniothyrium pirina*, *Sphaeropsis Malorum*, *Monochaetia Mali*, *Pestalozzia brevisita*, *Phyllosticta limitata*, *Phoma mali*, *Septoria piricola*, and undetermined species of *Phyllosticta*, *Metosphaeria*, and one of the *Tuberculariae*.

The fungus *Coniothyrium pirina* which was recently transferred from the genus *Phyllosticta* by Sheldon, was tested thoroughly by Hartley to determine whether or not it may act as a parasite. He concludes from the result of many inoculations under varying conditions, that the fungus is "merely a facultative parasite and does not cause the serious defoliation of apple trees which have been attributed to it." The same results were obtained by Hartley in experimental inoculations with pure cultures of *Coryneum foliicolum*.

Believing that the exact relation of all the fungi associated with the spots had not been thoroughly tested, an investigation was begun during the past summer to determine, if possible, the cause of the disease as it occurs in this state, and means of control by various spray mixtures.

Spots of various stages of development were taken from the leaves and by means of the poured plate method different species of fungi fruiting on them were isolated into pure cultures. The medium used for these cultures was beet agar, a medium

on which all of the fungi isolated grew well and produced an abundance of spores. Cultures were also secured by the slant agar tube method used by Scott and Rorer. Each method proved easy of manipulation and about equally effective.

The species of fungi which were found to predominate were *Coniothprium pirina*, *Coryneum foliicolum*, *Sphaeropsis malorum*, *Attenaria* sp. and one of the *Tuberculariae*. Occasionally other spores were met on making examinations of the spots but they were not isolated into culture. The number so isolated could doubtless have been materially increased. However, no other spore occurred abundantly enough to warrant the supposition that they were of primary importance in causing the spots.

The growths from many different spots yielded pure cultures of *Sphaeropsis malorum* and this was quite generally true, as pointed out by Scott and Rorer, when the spots taken for the cultures were still young and purple. From other spots pure cultures of *Coniothyrium pirina* were secured and the pycnidia of this fungus occurred more abundantly on the affected areas than any other.

In order to test the parasitic nature of the different fungi, various inoculations were made. Spores grown in pure cultures were placed in sterile distilled water and sprayed abundantly upon the upper and lower surfaces of clean, spot free leaves of young shoots of the trees growing in the station orchard. These inoculations were made always in the evening between five and six o'clock. The first of the series was made Aug. 1 and three other attempts were made later. Check branches were sprayed with distilled water. On none of the inoculated branches could a decided increase in the number of spots be detected. There were scarcely any new spots developed at this time from natural infection and many of the inoculations, as well as the checks, remained perfectly free, showing that the period at which the leaf is naturally infected is earlier in the spring and summer.

All of the fungi isolated have been kept growing in pure culture and it is hoped to test them still further on young seedlings and nursery stock in the greenhouse, and again in the orchard next season. As a result of this season's inoculation experiments it is impossible to offer more than negative results as to the cause of the spots. I am of the opinion, however, that the fungus *Sphaeropsis malorum* which is known to cause canker of apple limbs and is an active parasite, will be found to be the primary cause of apple leaf spot. This supposition must, how-





FIG. 1. Unsprayed tree defoliated by Leaf Spot.



FIG. 2. Sprayed tree adjacent to the above.







FIG. 1. Early Stage of Leaf Spot.

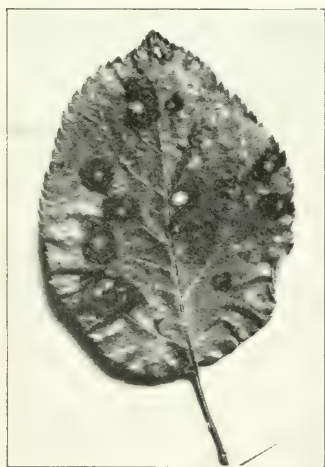


FIG. 2. Late Stage of Leaf Spot, showing growth in the size of the spots.



FIG. 3. Scab fungus as seen on the foliage.



ever, be supported by direct experiment before it can be definitely affirmed for the spots considered in this investigation.

#### TREATMENT.

Leaf spot is very readily controlled by spraying. The methods used in preventing scab or other fungus diseases are sufficient to keep the leaf spots under control. During the past season spraying experiments were carried on with young orchard trees of McIntosh, various spray mixtures being used. (See page 385).

The following table shows the results obtained from the several mixtures. It will be noted that on the unsprayed plots practically all of the leaves were spotted, while on some of the sprayed plots the per cent. was as low as eighteen. The number of spots on individual leaves taken from unsprayed trees was many times as great as ones from the sprayed plots, and had the number of spots per one hundred leaves been taken, the results in the table would have been still more striking. The trees were sprayed five times during the season but it is not probable that the fourth and fifth spraying had any decided effect on this disease. The first spraying was made May 15, and this was followed by four others on the following dates: May 27, June 10, June 18, July 30. A careful estimate of the per cent. of spotted leaves on the various plots is given in the following table:

Fungicide	Per cent Spotted
None .....	97%
Lime sulfur 9-6-50.....	21
None .....	95
Lime sulfur 2-1-50.....	18
" " Thomsen 1-25.....	26
" " 15-10-50 .....	21
" " Niagara 1-50.....	33
Bordeaux 3-3-50 .....	26
" Eagle 1-24 .....	26
" 4-4-50 .....	30

The leaves on the sprayed plots remained on the trees long after the unsprayed plots were completely defoliated. (Compare Pl. 8, Fig. 1 with Fig. 2).

It is not necessary to use special spray mixtures to combat this disease for as is shown above, the mixtures used in controlling the fungous diseases of the fruit will also prevent the "leaf-spot."

## PINE BLIGHT.

Much anxiety has been caused in New Hampshire in the past two years by the so-called "pine blight." The trouble has occurred chiefly on the white pine, *Pinus Strobus*. It has not been confined to New Hampshire but is widely distributed over New England and occurred in Pennsylvania and New York. It appears as a browning of the needles, which is fairly uniform over the entire tree. In some cases the tip of the needle is brown, while the base is green, and apparently normal. Such a condition is probably the result of frost after the needle had begun its development in the spring. The pine needle grows from the base, and it is thus possible for the tip to be injured by frost when young, and the better protected base remain uninjured and continue the development of the needle.

In other cases, the browning does not seem to be so definitely limited to the tip of the needle, but apparently spreads to the base as the season advances. In such cases, the otherwise green portion of the needle is often covered with yellowish spots. This condition cannot be attributed entirely to the frost and would suggest that the trouble might be the result of a parasitic fungus. Various experiments have been made to test this hypothesis, and while fungi are sometimes present, thus far, no fungus has been isolated from these affected needles that seems likely to prove to be the responsible agency.

A disease which affects the whole tree so uniformly might be expected to have its cause in the roots or trunk. Many trees have been dug up, and a thorough gross and microscopic examination made with this point in view. No evidence of insects or fungi have been found, and the roots and trunk of the diseased trees appear normal.

The only other possible explanation of the disease is that it is a physiological trouble resulting from drought, unfavorable location, or similar causes. In order to determine the probable effect of location and drought, a careful study has been made of the conditions existing in several different sections of the state where the trouble was most serious. Notes were taken on depth and nature of the soil, drainage, exposure, surrounding vegetation, extent of the disease, etc. The results thus far obtained indicate that a large per cent. of the injured trees are in worn out pastures and in sandy soil. Such trees would be favorably situated to receive the full effects of the droughts of the past two summers. When we recall that the pine is an extremely shallow-

rooted tree, it seems quite probable that much of the trouble has been due to dry weather.

As a means of determining whether the disease increased from year to year all of the trees, in two different pastures, that were affected in 1907 were located, and a description made of the condition of each tree. Notes taken late in 1908 showed that the disease had not spread to other trees. In some cases the new needles on the affected trees turned brown in the same manner as those of the previous year. This might be accounted for by the greatly weakened condition of the tree, resulting from the trouble of 1907, but more probably was partly due to the repeated droughts of the past summer.

The "pine blight" is evidently not a contagious disease and there seems to be no reason to expect marked development of the trouble.

#### NOTES ON APPLE DISEASES.

##### APPLE SCAB, *Venturia Pomi* (Fr.) Wint.

This disease was very serious in the summer of 1907 and did marked damage the past season. The greater prevalence of scab in the former season is probably due to the warm, dry weather of the past summer; the spread and development of the fungus being greatly favored by moisture.

*Appearance.* The disease produces serious results on both foliage and fruit. It attacks the leaves soon after they have unfolded in the spring and early in June it is quite evident on the foliage as circular, olive colored patches. See Fig. 3, Plate 9. These colonies produce large number of spores and serve as a source of infection for the fruit. The fungus greatly decreases the vitality of the leaf, usually causing it to fall prematurely. As a result of the disease trees are often practically defoliated long before the fruit is mature.

The most serious and most familiar results, however, are produced on the fruit. The effects found here are known among commercial apple men as "scab," "fungus" or "black spot." Circular spots one-eighth to one-half inch in diameter are produced. They are olive in color and in later stages are often surrounded by a narrow border of light gray. The scab colonies develop vigorously on the young fruit but later in the season the growth becomes very slow. The majority of the infections are made early in the season but a second spread of the disease often occurs in August. Its results are indicated by the numerous apparently young colonies on the fruit at gathering time.



Some of these are so small as to be readily overlooked, but may later make marked development in cellar storage.

*Development in Storage.* During the winter of 1907-8 much trouble was experienced with scab in the Boston cold storage plants, and great losses were met by commission merchants from this cause. Various specimens of the disease were sent to this station for identification. At first sight one familiar with the disease, as seen in the orchard, would be inclined to call the storage trouble a separate and distinct disease. The fungus made an unusual development beneath the cuticle before breaking through and the mycelium was very dark in color. As a result of this, sunken black spots developed on the apple that might attain a diameter of one-fourth inch, before any break was made in the skin. See Figs. 1 and 2, Plate 10. Later the cuticle was ruptured and the usual forms of spore and sporophore exposed. See Fig. 3, Plate 10. It does not seem probable that the disease could have spread through the cold storage building. It is very much more plausible to assume that the scab developed from very small colonies that were overlooked at the time of storage, or else from spores that were on the apples at that time. In cases where the apples were barrelled several days before reaching the storage plant it is very probable that the disease made rapid development during that time. The following fact furnishes strong evidence in support of this statement. In the fall of 1908 a barrel of perfect McIntosh apples was picked from unsprayed trees and a barrel from trees sprayed late in the season and the two placed in cellar storage. In two weeks the unsprayed apples were found to be badly scabbed while those that had been sprayed were still comparatively free from the disease. The spots must have developed from colonies that were not noticeable at the time of gathering, or else from spores lodged on the apples. There is no doubt but what there is much greater benefit derived from late sprayings for scab than is usually evident at the time of gathering.

*Treatment.* The disease can be controlled by spraying. The first application should be made as soon as the leaves unfold; the second, just after the blossoms have fallen; the third, two or three weeks later, and the fourth four or five weeks before gathering time. The first and second sprayings are especially important and should be very thorough. For further information in regard to treatment, see discussion under fungicides, pages 382-389.

**SOOTY BLOTCH.** *Phyllachora pomigena*. [(Schw.) Sacc.]

This disease produces sooty blotches on the surface of the apple that seriously mar the appearance of the fruit and may later affect its keeping qualities. See Fig. 2. Plate 11. The varieties having a light-colored skin are damaged most in appearance. The fungous growth is on the surface of the fruit and hence its development is greatly favored by moist weather.

*Treatment.* The disease is readily controlled by spraying as for scab. Thorough pruning is very important and if light and air have full access to the fruit the disease usually gives little trouble.

**APPLE RUST.** *Gymnosporangium* Spp.

*Distribution.* Apple rust is very widely distributed and in some sections quite injurious. It occurs abundantly throughout New Hampshire and while by no means one of the most serious apple troubles, it doubtless causes considerable damage. This disease occurs wherever apple trees and cedars are growing in close proximity.

*Appearance of the Disease.* The rust affects the leaves of the apple trees, causing yellowish spots, which often become somewhat thickened and in which are located the spore-bearing organs of the fungus. (Fig. 1. Plate 11). These spots appear on the leaves in May and June. The spores, which are produced in great numbers, are borne by the wind and attack the twigs of cedar trees, causing morbid growths or swellings, the so-called "cedar apples." (Fig 3, Plate 11). The fungus passes the winter in the tissue of the "cedar apple" and in the spring produces an abundance of spores in the gelatinous outgrowths of these galls. These spores, when borne back to the apple trees, set up the infection again and thus the fungus passes from one host back to the other.

*Treatment.* Spraying experiments have not proven satisfactory in controlling this disease, and since the "cedar apple" harbors the disease through the winter the method of control is obviously to destroy them, or, when practicable, the cedar trees themselves. This is at present the only effective method known.

**EUROPEAN APPLE TREE CANKER.** *Nectria ditissima* [Tul.]

Under ordinary conditions wounds on trees are healed over in course of time as a result of the activity of the adjacent living tissue. It is a common sight in the orchards of New Hamp-

shire to find wounds which have not healed over, sometimes even after the repeated attempts of several years. Such injured places are usually prevented from healing, and in some cases may be originally caused by the presence of a foreign organism. These wounds are commonly known as "cankers." In the twenty-eighth report, two cankers common on New Hampshire apple trees were described, one the Illinois Apple-tree Canker and the other the New York or Black Rot Canker. Since that time a third "canker" has been identified. This disease has long been known as a serious disease of the apple trees in Europe and hence is called the "European Apple-tree Canker." It is of widespread occurrence in the orchards of the state and has the characteristic appearance shown in Fig. 4, Plate 10. The series of ridges around the wound is due to repeated attempts to heal. The canker is caused by the presence of the fungus *Nectria ditissima*. Its mycelium spreads into the new growth as it attempts to cover the wound, killing it and thus enlarging the canker. In the fall of the year the mycelium of the fungus produces minute conidia. The following spring red lemon-shaped perithecia break through the bark in compact patches. These may be seen with the naked eye. They contain numerous two-celled spores borne in asci or sacs. These spores and the conidia are the agencies for spreading the disease.

*Treatment.* Cankered limbs should be cut out and *burned*. All wounds should be thoroughly coated with paint or tar.

#### WINTER INJURY.

The winter of 1906-07 caused very serious injury in the orchards of New Hampshire. The damage was especially great in young orchards and in those situated on low ground. Many trees were found to be entirely dead the next spring and many others had only sufficient vitality to put forth leaves on a few isolated limbs. (See Fig. 4, Plate 10). Upon examination of the inner bark of the injured trees and limbs, it was found to be brown and apparently dead. As the summer advanced it was evident that many trees that had appeared fairly vigorous early in the spring had sustained serious injury. The leaves on one large limb after another would wither and turn brown. It was found in such cases that the cambium had been dead over large areas from the first of the season and that the limb was practically girdled. Throughout the summer of 1907, and even in that of 1908, trees continued to succumb to the injuries received in the above mentioned winter. On these trees and also on others that

survived sunken, dead areas of bark were common. (Plates 12 and 13.) These became quite noticeable by the middle of the summer of 1907, and on the trees that lived, continued to become more prominent. The living tissue at the margin of these dead patches made more than normal growth, pushing out over the injury and developing a marked ridge around it, thus leaving it as a conspicuously depressed area. The line between the living and dead bark was often marked by an open crack.

Various varieties of trees suffered from winter injury but the Baldwin seemed to have been far more susceptible than any other variety of apple. The large number of cases of serious injury to the Baldwins was probably due, in part, to the preponderance of Baldwin trees in the state, but this does not seem to be the whole explanation.

*Cause of the Winter Injury.* The winter of 1906-7 was an unusually cold one and the low temperatures recorded might be regarded as sufficient explanation, in themselves, for the serious injury. Injury from cold in plants, however, is largely dependent upon the condition of the cells exposed. The condition in which the apple trees went into the winter is a very important consideration. The fall of 1906 was characterized by the frequency of showers and unusually high temperatures. As a result of this, growth continued late in the season and the trees went into the winter without the usual reduction in amount of water, and with the wood not completely matured. This must have been especially true of vigorous growing varieties like the Baldwin, and of trees situated on low ground and in poorly drained soil. The growing tissue of these trees must have gone into the winter in an immature and water-gorged condition that was most unfavorable for withstanding the cold weather that came on early in the winter. The apple crop in 1906 was large and the vitality of the trees greatly reduced from this source. An additional cause for the serious results of the following winter are to be found in this overproduction of the previous season.

#### SPRAY INJURY.

Spraying experiments conducted in New Hampshire orchards for the past three years have shown conclusively that injury from Bordeaux mixture is not of uncommon occurrence. It appears on the fruit first as small, round, black or brown specks scattered thickly over the surface of the apple. As the fruit matures the skin takes on a corky and russeted surface, that greatly mars its appearance. In serious cases the fruit may be

much roughened and deformed and sometimes large sunken scars appear on its surface. Such fruit often drops from the tree early in the season and in no case is it of any value for commercial or storage purposes.

On the foliage, brown, circular spots two or three millimeters in diameter are produced. These bear a very close resemblance to the leaf spot previously described. Soon after the appearance of the spots the leaves may begin to turn yellow and die. Leaves so affected soon fall and in serious cases the trees may be almost entirely defoliated. Such instances, however, are rare.

The most serious injuries have been obtained from **sprayings** made a few weeks after the blossoms fall. Sprayings made in August or late in July have done little or no damage. In all cases of **bordeaux** injury the sprayings was followed within the next few days by a rain storm. The experiments of the **past** three years have shown that the Baldwin apple is more susceptible to injury from Bordeaux than the McIntosh. For further discussion, see Fungicides, pages 382-389.

#### NOTES ON PEACH DISEASES.

##### PEACH YELLOWS.

**History and Distribution.** The Yellows is an American disease of the peach and allied fruits. It has been known for over one hundred years, and is widely distributed throughout the states east of the Mississippi and north of the northern boundary of Tennessee and North Carolina. It is most abundant in Delaware, Maryland, New Jersey, New York, Connecticut, Michigan, Pennsylvania and is doubtless spreading slowly to other states. Yellows had not been definitely reported from New Hampshire until the summer of 1908.

The writer is not aware of how general its distribution throughout the states will prove to be, but peach growers are warned to keep a vigilant watch over their orchards as the disease is known to occur within the boundaries of the state. Like tuberculosis in the human race, Yellows is the most dreaded disease to which the peach is subject, for when a tree once becomes affected with this disease certain death is the result.

*Symptoms of Yellows.* The term Yellows as applied to the disease is in a measure unfortunate, since people are often caused to regard yellowness of the tree as one of the first and indisputable symptoms of the disease. This, however, is not always true. Many peach orchards which the inexperienced observer believes to be suffering from Yellows, are but in ad-



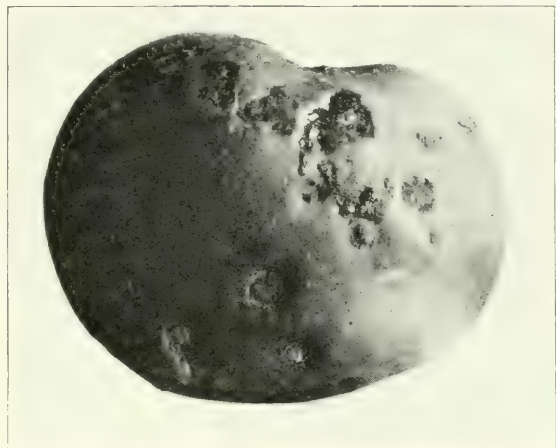


FIG. 1. Scab on apple from cold storage.

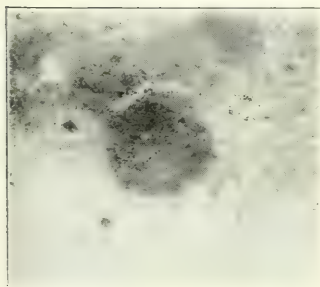


FIG. 2. Early stage of scab on cold storage apple.

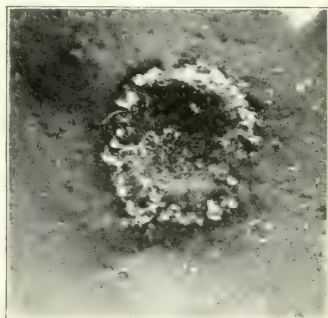


FIG. 3. Later stages of scab on cold storage apple.



FIG. 4. European apple-tree canker.





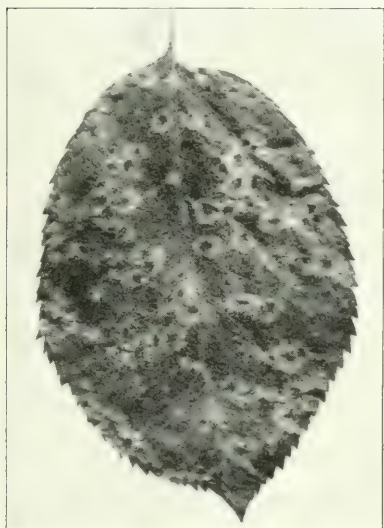


FIG. 1. Rust on apple leaf.

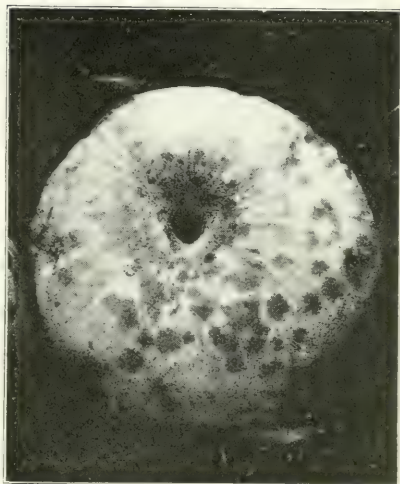


FIG. 2. "Sooty Blotch" of apple.



FIG. 3. Cedar Apple on Red Cedar.





Winter Injury on a young apple tree.





FIG. 1. Winter Injury on body of apple tree.



FIG. 2. Spray Injury.

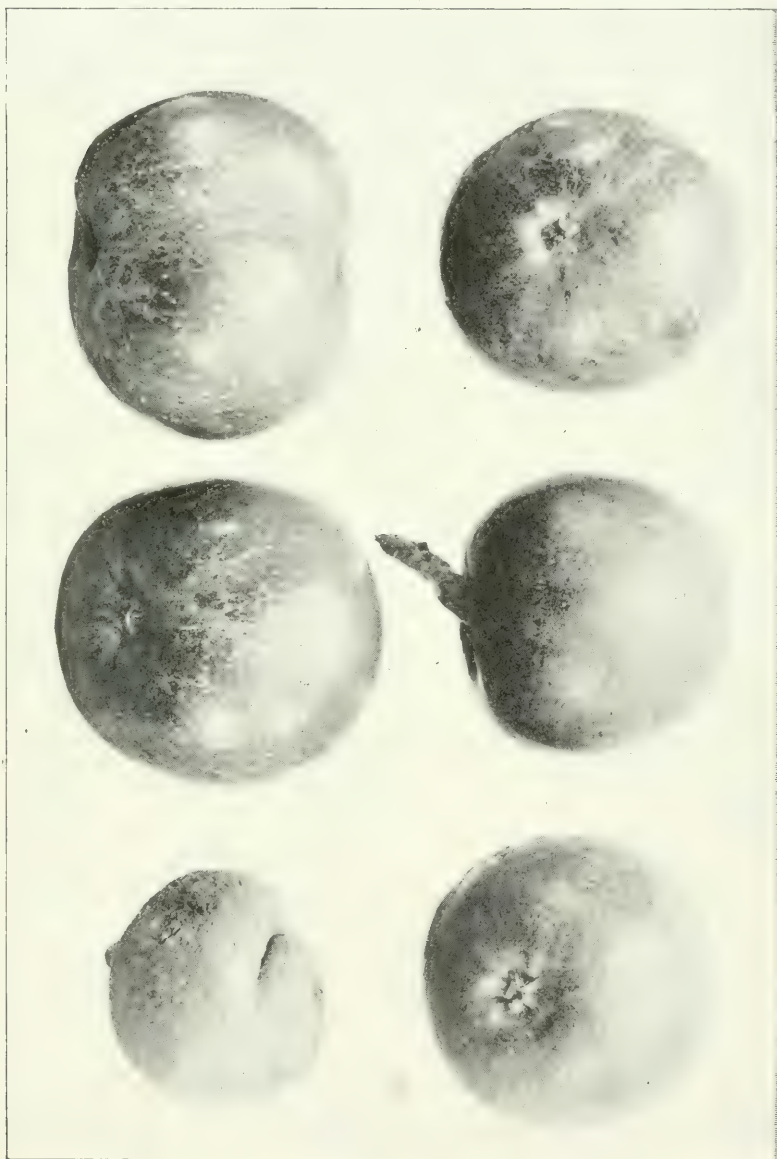






Peach Leaf Curl.





Baldwin apples russeted with Bordeaux mixture in 1906.



vanced stages of other diseased conditions brought on by lack of proper pruning, fertilizing and precaution against borers and insect pests. The leaf curl has also been mistaken for yellows although the symptoms are quite different.

Yellows is a definite disease fatal and communicable and in many states amenable to the police powers of the commonwealth. The symptoms of yellows when once learned are so characteristic that there is little danger of confusing them with the symptoms of borers, neglect or drought. In bearing trees the first indication of the presence of Yellows is the premature ripening of the fruit. This may occur from one to six weeks earlier than the normal time of ripening. These prematurely ripened fruits are unmistakably characterized by the presence of bright red

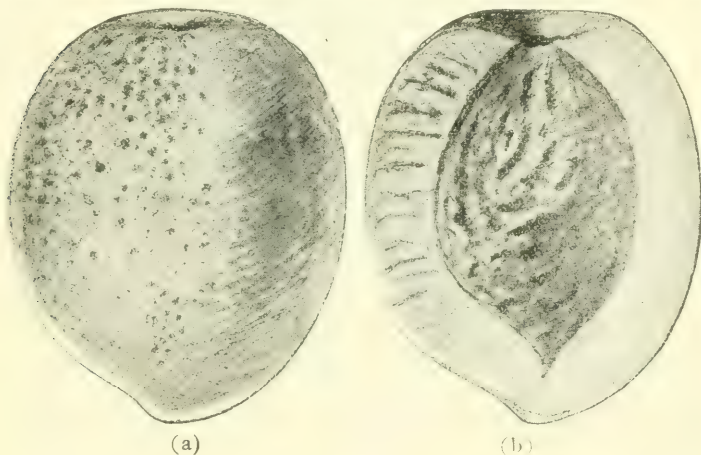


FIG. 15. Peach yellows, (a) showing the spotted appearance of the fruit, and (b) the streaks in the flesh. (After L. H. Bailey).

blotches and the flesh is often more or less marked with red spots and streaks which extend from the surface to the pit. (Fig. 15). The mere prematureness of ripening is not, however, conclusive proof of the presence of Yellows. It is the presence of the red blotches and streaks on such prematurely ripened fruits. It often happens that during the first year of the disease this kind of fruit is restricted to particular limbs or even to single twigs which, however, do not differ in appearance from other limbs of the tree.

In the second year, the disease spreads to other parts of the tree, even if the diseased branches have been removed. Addi-



tional symptoms also begin to be manifest, chief among which may be mentioned the development of winter buds out of their normal season and the growth of feeble twiggy and much branched shoots on the main branches and even on the trunk. The premature expanding of buds may be seen most clearly in the fall after the tree has lost its leaves. These shoots rarely grow more than three or four inches long.

The leaves upon them are small and narrow, yellowish and they stand out stiffly from the stem, contrasting strongly with the drooping healthy leaves below them. (Fig. 16). It occasionally happens that the blossoms of the diseased shoots open in the fall.



FIG. 16. Yellows "tip" appearing late in October. (After L. H. Bailey.)

The third symptom is the growth of shoots from adventitious or resting buds on the trunk and larger branches. The leaves upon these shoots are quite long and narrow, yellow in color and some of the larger "water sprouts" develop broom-like clusters of branches which have pale green, slender leaves. Fig. 17.

In late stages of yellows the tree has a general stunted appearance. The leaves are all of a reddish or yellowish color and are greatly reduced in size. Trees in this condition might be confused with those suffering from some lack of vigor brought on by other causes. In distinguishing Yellows the above peculiarities of growth and development must be used rather than the notion of yellow color. Trees which show these characters —

premature ripening of fruit; fruit spotted and blotched with red; twiggy clustered shoots bearing small yellow foliage, may be considered as certainly affected with Yellows.

*Cause and Spread.* Yellows is a contagious disease. It is spread from tree to tree and sooner or later every tree in an orchard or even the entire community in which the disease appears may be expected to die unless precautions are taken to keep it in check. It is not known how Yellows spreads.



FIG. 17. Yellows tuft—1-2 nat. size. (After Bailey).

There appears to be no specific germ associated with it. The disease is not spread through the soil, for young trees set where Yellows trees have been removed are no more liable to contract the disease than are the trees which are some distance away. This has been amply demonstrated in the peach growing section of Michigan. It is not spread from flower to flower for many trees contract the disease that have never blossomed. It is not inherent in the roots, for trees grafted upon plum stocks often contract the disease. Briefly it may be said that almost every origin which has been ascribed for the disease has been shown untenable.

Although the cause of Yellows is unknown, it has been clearly shown in many districts that if affected trees are permitted to live, the disease spreads to other trees. Cases are cited in which affected trees which have been cut down and left in the orchard have spread the disease. Dragging uprooted, diseased trees through the orchard is known to spread the infection. The disease has doubtless gained entrance into many sections through nursery stock.

*Prevention and Control.* With the present knowledge of the disease its cure seems impossible. Thus far the only successful measures employed in combating it have been of a preventive nature. There being no germ or insect pest associated with the disease, the attempts to control it by spraying have proven futile. Experiments with different fertilizers have been of no avail. *Whenever a tree becomes affected with this most subtle of all diseases its final death is inevitable.* The contagion and spread being as explained above, the remedy suggests itself—removal of the source of contagion. Practice has shown this to be the only effective method. Yellows is prevented by the removal of all affected trees *root and branch* and their subsequent destruction by fire as near the point of removal as practicable. In order to keep the stand of the orchard, young trees may be planted in the same place the following spring. Experience has shown that there is a rather less tendency for these trees to contract yellows than is the case with adjacent trees. This method alone has proved sufficient to stem the tide of invasion which at one time threatened to destroy the peach raising industry in some of the best peach districts. Its success depends in a large measure on the co-operation of all the owners of peach orchards for one or two affected orchards in a community if not properly treated are sufficient to continually spread the disease.

LEAF CURL OF PEACH. (*Exoascus deformans*. Burk.)

The disease of the peach known as leaf curl, is very widely distributed. It is found practically wherever the peach is cultivated and aside from yellows is one of the most serious diseases to which it is subject. Pierce gives as an estimate of the total losses in the United States in a single year from this source alone, the sum of \$3,000,000.

*Appearance of the Disease.* This disease affects only the leaves and twigs of the peach, and the twigs are not usually attacked in a manner serious enough to attract attention. The effect on the leaves, is, however, very striking and is quite easily recognized. The leaves often show the characteristic appearance of the disease at the time they emerge from the bud. A roughened surface and an excess of coloring are the first symptoms manifest. As the young leaves quickly grow to their normal size, the affected part is thrown into a series of irregular folds which frequently run transversely to the long axis of the leaf. It often happens that the distortions draw the edges of the leaf together in such a way that it presents an appearance of being inflated. (Plate 14.) The entire leaf or only a part of it may become affected. In mature leaves the color may become somewhat reddish, but the green color is usually lost and the leaf is characterized by a pale discoloration. Such affected leaves soon fall off and in severe cases the tree may be entirely defoliated and normal growth seriously checked. Bearing trees lose their fruit for the season and it not infrequently happens that no fruit buds are formed for the next year, thus resulting in a loss of two crops. After the affected leaves have fallen, dormant buds often develop, and the tree makes an attempt to supply itself with new and healthy foliage. This second crop of leaves is rarely attacked by the curl.

*Cause of the Disease.* The curl of peach leaves is caused by the fungus *Exoascus deformans*, which lives through the winter in the buds and affected branches and continues its growth along with the young leaves in the spring. The spores of the fungus are produced in short, erect growths of a sac-like nature and each sac contains eight spores. It is these numerous sacs or asci which give to the affected leaves the somewhat mealy appearance. These spores are very small and light and easily borne about by the wind. Whenever they fall upon the susceptible parts of another tree, they grow into its tissue and so cause the disease. Doubtless many of the spores live through



the winter, either on the tree or on the ground, and help spread the infection in the spring.

*Treatment.* Since the fungus passes through the winter in the form of a mycelium in the twigs and buds it will be readily seen that attempts to control the disease by spraying cannot be entirely successful the first year. Leaf curl may, however, be effectively controlled by:

1. Spraying with Bordeaux just previous to the opening of the buds in the spring. This spraying is *very important*.
2. Spraying again with weak Bordeaux as soon as the blossoms have fallen. This prevents infection from spores that have wintered over on trees or on the ground.
3. Spraying again with weak Bordeaux when the affected leaves begin to manifest the mealy appearance. This prevents summer infection of leaves and of the buds for the succeeding year.

#### FUNGICIDES.

In view of the fact that it had been repeatedly demonstrated in New Hampshire orchards that home made Bordeaux may cause injury to the fruit and foliage, (page 375) it was important to determine, as far as possible, the cause of this and also to find some means of obviating the trouble.

*Cause of Bordeaux Injury.* Extensive studies have been made on the first point in the experiment stations of Illinois, New York, and other states, without any satisfactory conclusion being reached. The problem has been under observation at the New Hampshire station for several years and efforts have been made to determine the cause, but without any great success. Attempts have been made to produce the trouble artificially, but have given only negative results. The chemists of the stations have made studies of the chemical nature of bordeaux and of its probable reactions as exposed on the tree, but the work has not yet been brought to a conclusion. It is not possible with our present knowledge of the matter to give a complete explanation of the cause, but our observations agree with those from other stations, that the atmospheric conditions may greatly modify the action of the bordeaux; injury to the fruit and foliage usually resulting from the effects of a rain storm soon after spraying. The washing out of the excess lime by this means is a probable explanation for a large part of the injury.

*Experiments with Bordeaux Mixture.* A constantly increasing number of prepared bordeauxs are on the market and are being

extensively bought by the public. Many of the agents for these claim their product to contain great fungicidal value combined with freedom from injury to the foliage and fruit. It was decided to test the value of a number of these, as compared with various home-made mixtures. If results were to be obtained in a few years it was advisable to test these on plants which were practically certain to be diseased. The McIntosh apple scarcely ever escapes the work of the scab and was therefore a desirable tree to work with. In the spring of 1907, arrangements were made with Arthur Ladd and Jonathan Smith of Deerfield for carrying on such experiments in their McIntosh orchards.

The proprietary mixtures used were Leggett's Dry Bordeaux and Leggett's Oxidized Dry Bordeaux sold by Leggett & Brother of New York; Target Quick Bordeaux and Target Standard Bordeaux, sold by the American Horticultural Distributing Co., of Martinsburg, W. Va.; Eagle Bordeaux sold by the Adler Color & Chemical Works of New York; French Bordeaux, sold by Hammond's Slug Shot Works, Fishkill-on-Hudson, New York; Lenox Bordeaux, from Lenox Sprayer and Chemical Co., Pittsfield, Mass.; Lion Bordeaux, from the James A. Blanchard Co., New York; Fairmount Bordeaux, from the Fairmount Chemical Laboratories of Philadelphia, Pa.; and Pyrox from the Bowker Insecticide Co., Boston. All of these except the first three, are paste bordeauxs. The Target Quick Bordeaux consists of a bag of fine pulverized copper sulfate and another of finely ground lime which are to be hung in a barrel of water to dissolve, thus producing a mixture very similar to home-made bordeaux. All of the proprietary mixtures were made up as directed on the package.

Along with these proprietary mixtures was used copper phosphate, home-made bordeauxs and benzoate of soda bordeaux. In describing a bordeaux the number of pounds of copper sulfate is given before that of lime, thus a 2-4-50 bordeaux contained 2 pounds of copper sulfate and four of lime to fifty gallons. The sodium benzoate of plots 18 and 20 was prepared by combining the copper sulfate and benzoate of soda before the addition of the lime and that in plot 19 was made by adding the benzoate of soda solution to already prepared bordeaux. One-half pound of sodium benzoate was used to fifty gallons of the mixture.

Each plot consisted of five or more trees. The first spraying was made May 17, the second June 7 as the blossoms were falling, the third June 21. The first spraying was omitted on plots



19 and 20. Notes were taken on the drops August 1, August 27, and October 1. The apples were gathered the first week in October. Any apple having even a small scab spot was considered scabbed. The results given below are estimated on total dropped and picked fruit:

Plot.	Fungicide.	Percentage Scabbed
LADD ORCHARD.		
1.	Bordeaux, Lenox .....	79.9
2.	Bordeaux, Target Quick .....	67.7
3.	Bordeaux, Standard .....	63.9
4.	Bordeaux, Leggett's .....	82.8
5.	Bordeaux, Leggett's Oxidized.....	83.4
6.	Bordeaux, Eagle .....	68.8
7.	Bordeaux, French .....	64.4
8.	Bordeaux, Lion .....	90.9
9.	Bordeaux, Fairmount .....	95.0
10.	Copper phosphate 15 lbs. to 50 gal.....	82.2
11.	Bordeaux, 3-4-50 .....	57.1
12.	Bordeaux, Pyrox .....	81.0
13.	Bordeaux, 2-4-50 .....	73.0
14.	None .....	86.0
SMITH ORCHARD.		
15.	Bordeaux, 4-4-50.....	53.8
16.	Bordeaux, 3-4-50 .....	52.1
17.	Bordeaux, 2-4-50 .....	66.0
18.	Bordeaux, Sod Benz. 1-1-½-50.....	70.4
19.	Bordeaux, Sod Benz. 1-1-½-50.....	81.7
20.	Bordeaux, Sod Benz. 1-1-½-50.....	90.7
21.	None .....	93.9

The greater percentage of scab on plot 20 than on 18 indicates the value of the first spraying. The large percentage of scab on the orchards, as a whole, is partly due to a late spread of the disease from the unsprayed plots and from those sprayed with inefficient mixture to other parts of the orchard. This was shown by the large number of young scab spots on the apples at the time of gathering and also by notes taken on development of the disease at various times during the season. The contrast in the results is therefore not so great as the probable contrast in fungicidal value of the mixtures.

*Chemical Analyses.* A chemical analysis was made by the station chemists, of the various bordeauxs used in the experiments. The first three columns below give the result of the analysis of a sample of the prepared package as placed on the market. In the third and fourth columns are given the number of pounds of copper sulfate and of lime that a fifty gallon barrel

of the mixture would contain, if made according to the directions furnished by the company.

Fungicide.	Water.	Copper Oxide.	Calcium Oxide.	Copper Sulfate per barrel.	Lime per bbl.
Pyrox .....	65.2	2.22	3.00	.35	.15
Lenox .....	67.87	1.54	17.76	.49	1.78
Lion .....	80.00	3.12	9.70	1.00	.97
French .....	81.6	3.13	4.54	2.00	.91
Grassellis .....	50.19	7.32	22.99	2.34	2.30
Fairmount .....	50.0	7.65	12.35	2.45	1.24
Standard .....	63.0	4.81	15.35	3.08	3.07
Target Quick .....				4.00	6.00
Eagle .....	54.1	6.7	11.56	4.29	2.31
Leggett's blue .....	4.0	13.73	41.28	4.39	4.13
Leggett's oxidized...	7.3	17.8	27.6	5.70	2.76

Tests were not made to determine what other ingredients than copper and calcium compounds might be present. The first three as given above do not have more copper than a 1-3-50 Bordeaux, and the results obtained show their effectiveness to be in keeping with their strength. The next two do not vary far from a 2-4-50 bordeaux, either in strength or in results. The Fairmount paste was in bad mechanical condition and might have given better results if the solution had been made in hot water or had been allowed to stand over night before using. No such directions were given on the package, however. As used, many large crystals of copper sulfate were taken out in passing the liquid through the sieve. It will be noticed that several of the mixtures have three and four pounds of copper as sulfate to the barrel. Of these, the paste bordeaux were quite effective but not so much so as the home-made bordeaux of equal strength. The dry bordeaux and the so-called copper phosphate were entirely unsatisfactory as fungicides in spite of the large amount of copper present. In addition to this they produced decided injury to the foliage. This was especially true of the oxidized Leggett mixture. Slight injury of the foliage was also found on the plot sprayed with Eagle bordeaux and with the copper phosphate. No injury was found on the trees treated with the home-made mixture, even when used in the 4-4-50 strength. The results show that the home-made Bordeaux is a more satisfactory mixture than any of the proprietary preparations, and that the 3-3-50 formula is the weakest solution that is likely to give satisfactory results.

#### CO-OPERATIVE WORK WITH THE BUREAU OF PLANT INDUSTRY.

In 1908 arrangements were made with Prof. W. M. Scott of the Bureau of Plant Industry, U. S. Department of Agriculture,

for some co-operative work between the New Hampshire Experiment Station and the Bureau of Plant Industry, one-half of the expense of the experiments to be paid by each party.

In preceding years Professor Scott had secured very satisfactory results in Arkansas and other sections of the south with various lime-sulfur solutions used as fungicides. In view of the possibility of injury from the various bordeauxs, it seemed especially desirable to test the comparative value of these lime-sulfur solutions and bordeaux under New England conditions. Arrangements were made to carry out such tests in the same orchards in which the experiments of 1907 were conducted. Six varieties of lime-sulfur solution and six different Bordeauxs were used.

*Self-boiled Lime-Sulfur.* In the preparation of the self-boiled lime-sulfur solutions, 15 pounds of fresh stone lime were placed in a 50-gallon barrel and 2 or 3 gallons of water poured over it. Ten pounds of sulfur were immediately added and another bucket of water. The heat from the slaking lime soon began to boil the mixture violently. Burning was prevented by stirring. If the mass became too thick to stir, more water was added, but the amount of water was kept at a minimum in order to secure the maximum of heat for cooking the mixture. 6 to 8 gallons of water were usually required. The barrel was covered with a piece of gunny sack to check the escape of the heat. The boiling continued from 20 to 30 minutes, according to the quality of the lime. When the boiling ceased the solution was diluted to 50 gallons for use.

In the presence of the heat a part of the sulfur combined with the lime, producing a dark brown liquid consisting largely of calcium sulfide, but much of the sulfur remained unchanged. The mixture was strained through a sieve of about 20 meshes to the inch, care being taken to work the sulfur and the finer lime particles through.

For the preparation of the 9-6-50 mixture given below, 6 2-3 gallons of water were added to each 10 gallons of the 15-10-50 solution.

*Boiled Lime-Sulfur Solution.* In the preparation of this mixture 2 pounds of lime and 1 pound of sulfur were boiled in a small quantity of water for 45 minutes and then diluted to 50 gallons. By this method of preparation the conversion of the sulfur was complete, producing a dark brown solution of calcium sulfid. A part of the lime was left unchanged and was worked through the sieve as in the above mixtures.

*Unboiled Lime-Sulfur Solution.* In the preparation of this mixture 9 pounds of lime were added to 25 gallons of water and 6 pounds of sulfur to another 25 gallons. Equal parts of these two solutions were mixed with thorough stirring. No heat was applied and the association of the lime and sulfur was merely a mechanical one.

*Proprietary Lime-Sulfur Solutions.* Two of the commercial lime-sulfur solutions were used, one prepared by the Thomsen Chemical Co., of Baltimore, Md., and the other by the Niagara Sprayer Co., of Middleport, N. Y. The mixtures put upon the market by these companies is such as would be obtained by boiling a lime-sulfur solution and decanting off the brown calcium sulfid solution for use. The Thomsen mixture was diluted in the ratio of 1 to 24 and the Niagara in the ratio of 1 to 49 before using.

*Bordeauxs.* Two strengths of home-made bordeaux and four proprietary mixtures were used. The latter were the Eagle, French, Standard and Grassellis preparations. These prepared paste Bordeauxs were diluted according to the directions on the packages.

The first spraying was made May 15th, before the flower buds had opened; the second May 27th, at the time the blossoms were falling; the third June 10th; the fourth June 18th, and the fifth July 30th. Paris Green was used at the rate of 6 oz. to 50 gal. in the 2nd and 4th sprayings. Notes were taken on the drops on August 14th and again Sept. 11th. The apples were gathered between Sept. 10th and Sept. 15th, and notes were taken on the picked fruit at the time of gathering. The following tables are based upon the data obtained from the picked fruit and the drops at the time of gathering. The badly scabbed apples were those so seriously damaged by scab as to be unmarketable.

Plot:	Fungicide.	Spraying.	Per cent. Badly scabbed.	Per cent. Slightly scabbed.	Per cent. Free from scab
In the orchard of Arthur Ladd.					
1.	L. & S. 15-10-50 self-boiled..	1, 2, 3, 4, 5	2.9	45.	52.1
2.	L. & S. 9-6-50 self-boiled...	1, 2, 3, 4, 5	10.2	57.8	32.
3.	L. & S. 2-1-50 boiled.....	1, 2, 3, 4, 5	3.8	42.6	53.6
4.	L. & S. Thomsen.....	1, 2, 3, 4, 5	.9	9.4	89.7
5.	L. & S. Niagara.....	1, 2, 3, 4, 5	1.3	16.5	82.2
6.	Bordeaux 3-3-50.....	1, 2, 3, 4, 5	1.2	18.2	80.6
7.	Bordeaux Eagle.....	1, 2, 3, 4, 5	1.7	24.5	73.8
8.	L. & S. 15-10-50 self-boiled..	1, 2, 4, 5	9.5	55.8	34.7
9.	L. & S. 9-6-50 self-boiled...	1, 2, 4, 5	7.1	46.4	46.5
10.	Bordeaux 3-3-50.....	1, 2, 4, 5	1.2	9.4	89.4
11.	Bordeaux 4-4-50.....	1, 2, 4, 5	2.7	5.6	91.7
12.	None .....		21.9	45.2	32.9

Plot:	Fungicide.	Spraying.	Per cent. Badly scabbed.	Per cent. Slightly scabb'd.	Per cent. Free from scab.
In the orchard of Jonathan Smith.					
13.	L. & S. 9-6-50 unboiled...	1, 2, 4 and 5	23.3	42.9	43.8
14.	Bordeaux, Standard.....	1, 2, 4 and 5	5.4	39.	55.6
15.	Bordeaux, Grasselli's.....				
16.	Bordeaux, 3-3-50.....	1, 2, 4 and 5	3.6	20.6	75.8
17.	Bordeaux, French.....	1, 2, 4 and 5	1.6	21.	77.4
18.	None .....		60.4	27.9	11.7

Plots 2, 8 and 14 were unfavorably situated and the large per cent. of scab may be partly due to this fact. The weather following the third spraying was dry and it is not surprising that the trees having this application gave but little better results than those without it.

The bordeauxs seem to have been the most efficient fungicides, with the proprietary lime-sulfur mixtures a close second. The calcium sulfid being far more soluble than the copper hydroxide, the lime sulfur solution washed off more readily than the Bordeaux. If the season had been a rainy one it is quite possible that there would have been a greater contrast in the efficiency of the two classes of fungicides, the change being in favor of the bordeauxs.

Judging from the prepared lime-sulfur solutions and from the lime-sulfur formulas used in preparing fungicides in the state of Oregon, it seems probable that the boiled lime-sulfur solution might have been used several times as strong.

The results obtained with self-boiled and with the unboiled lime-sulfur solutions do not indicate that either sulfur or lime is very efficient in controlling the scab. When viewed in connection with the results obtained with the proprietary and the boiled mixtures they emphasize the importance of the calcium sulfid and the necessity of heat in the preparation. The use of hot water in the preparation of the self-boiled mixtures, as has often been done by Professor Scott, would undoubtedly secure better results. It seems to the writer, however, that where it is possible to boil the mixture and make the chemical reaction between the lime and sulfur complete, better results will be obtained by doing this and using a smaller amount of sulfur than by using a larger amount of lime and sulfur and trying to regulate the extent of the chemical change by the amount of heat applied.

Too much emphasis should not be placed upon the results of one season but the lime-sulfur solutions are undoubtedly to be classed as valuable fungicides. They held the scab in check



almost as well as the bordeauxs, and produced no injury to foliage or fruit. In fact while there was occasionally an apple on the bordeaux plots whose appearance had been damaged by spray the apples on the lime-sulfur plots were smoother and apparently more waxy and more highly colored than on the check plots. It would seem that a very satisfactory treatment for an orchard would be found in making the first and possibly last sprayings with bordeaux and the second two with a lime-sulfur solution. The danger from bordeaux injury would thus be largely obviated. The McIntosh apple is less susceptible to bordeaux injury than the Baldwin, and far more susceptible to scab. The above suggestion is therefore, likely to be of more value in treating the latter than the former variety. The value of bordeaux and lime-sulfur mixtures in controlling fruit spot and leaf spot has already been discussed. (Pages 346, 369.)

#### WEED DESTRUCTION.

In the summer of 1907 wild mustard came up very thick in an oats field on the college farm. This was thoroughly sprayed with iron sulfate solution when the mustard plants were small. Two pounds of iron sulfate were used to each gallon of water and the solution applied at the rate of fifty gallons to the acre. The wild mustard was practically all killed with one application. The leaves of the oats were found to have a few black dead spots on them, but the injury was not serious. A similar experiment was made in 1908 with equally satisfactory results. The experiments show that iron sulfate is a valuable agency in the destruction of wild mustard if applied before it begins to make its stem growth. The best results are secured by an early application.



## REPORT OF THE DEPARTMENT OF ENTOMOLOGY.

E. DWIGHT SANDERSON.

The changes in the assistants in the department have been noted in the Director's report. These frequent changes have interfered with the work of the department, and the writer's duties as director have prevented as much personal entomological work as formerly.

During the past two years the offices and laboratories of the department have been moved entirely to Thompson Hall. Among the additions to equipment should be noted several large field cages for the study of insect life out of doors, several thermographs and thermometers, and a large constant temperature oven, built according to our plans, to maintain temperatures between 50 and 70 F., for use in our investigations of the relation of temperature to insect life.

## INVESTIGATIONS.

It has been the policy of the department to concentrate effort upon but few investigations. The principal work has been upon the codling moth, which is reported herewith. Investigations of the Striped Cucumber Beetle, carried on in 1907, are also reported below. In July, 1908, a very unusual insect outbreak occurred throughout the hardwood forests on the hills of the state, which proved to be the work of the Antlered Maple Worm (*Heterocampa guttivitta* Walk.) a native insect not heretofore known as injurious. In the writer's absence, his assistant, Mr. C. F. Jackson, was at once directed to fully investigate the outbreak and a week or two later the writer visited Ossipee and Tamworth and the White Mountain Region, to determine the extent of the injury. While Mr. W. M. Barrows visited towns lying between Laconia and Claremont, Mr. C. F. Jackson visited towns southwest of Concord and Mr. W. S. Abbott studied the conditions in Cheshire County. Mr. Jackson has prepared a report which summarizes our knowledge of the pest, which appears on page 514.

Investigations concerning the relation of temperature to insect life, as outlined in our last biennial report, have been carried on constantly, numerous experiments have been made and a large amount of data secured, but the work has not progressed sufficiently to warrant publication. Two papers upon special

phases of this work have, however, been published which are noted under Publications.

#### CORRESPONDENCE AND STATE WORK.

The correspondence of the entomologist increases each year, and with the advent of the brown-tail and gipsy moths increased interest is being taken in combating all insect pests.

The entomologist has continued to act as nursery inspector for the State Board of Agriculture.

Besides publishing two bulletins and numerous newspaper articles upon the brown-tail and gipsy moths, the entomologist took an active part in calling the attention of the public to the danger from these pests and the need of state legislation for their control, through lectures and correspondence, and the law enacted by the last session of the General Court, was doubtless largely due to the public opinion thus aroused.

#### PUBLICATIONS.

The publications of the writer during the period of this report, have been as follows:

*Publications of the New Hampshire Agricultural Experiment Station.*

1907, January. Bulletin 128, The Brown-tail Moth and the Gypsy Moth in 1906. In collaboration with Dr. L. O. Howard. Pgs. 22, figs. 8. An account of the spread of these pests in 1906 and suggestions for their treatment.

April. Bulletin 131. Spraying the Apple Orchard. In collaboration with T. J. Headlee and Charles Brooks. Pgs. 48, figs. 37. The results of investigations of the life history and experiments in spraying for the codling moth in 1906, and the results of experiments against the apple scab and fruit spot, with directions for spraying.

1908, February. Bulletin 136. The Gypsy and Brown-tail Moths in New Hampshire. Pgs. 64, figs. 34. (Printed by order of the Governor and Council.) A revision of bulletins 121 and 122, brought up-to-date, and Chapter 147, Laws of 1907, N. H., concerning these pests.

July. Bulletin 139. Caterpillars Injuring Apple Foliage in Late Summer. Pgs. 24, figs. 13. A popular account of the fall web-worm, yellow-necked apple caterpillar, red-humped apple caterpillar, tussock moth, and hickory tiger moth, with directions for spraying for their control.

August. Circular 3. The Apple Leaf-aphis. Pgs. 6, figs. 4.

Circular 4. The Oyster-shell Scale. Scale. Pgs. 4, figs. 3.

Circular 5. The San Jose Scale. Pgs. 12, figs. 5. Pl. 1.

- May. School Bulletin No. 1. Agricultural Education Through Rural Schools. Pgs. 20, figs. 7.  
 August. Press Circular, 11. An Outbreak of Forest Caterpillars.  
 August. Scientific Contributions No. 1. The Influence of Minimum Temperatures in Limiting the Northern Distribution of Insects. Pgs. 18. Maps 7. Reprinted from the Journal of Economic Entomology, Vol. 1, No. 4.

### Other Publications.

- 1907, January. National Legislation to Control the Spread of Insect Pests. National Nurseryman. Pgs. 15, 16.  
 March. The War with The Insects. Farming. Pgs. 58, figs. 3.  
 April. A Spraying Calendar for the Home Garden. Garden Magazine. Pgs. 142-146, figs. 17.  
 November. What Research in Economic Entomology is Legitimate under the Adams Fund? Bulletin 67, Bureau of Entomology, U. S. Dept. Agr. Pgs. 77-84.  
 A Spray Nozzle for the Mechanical Mixture of Oil with Water or Other Liquids. L. c. pgs. 112-116, figs. 6, 7.  
 1908, February. The Relation of Temperature to the Hibernation of Insects. Journal of Economic Entomology. Vol. 1, Pgs. 56-65, figs. 1, 2.  
 April. Preliminary Report on the Life History of the Codling Moth and Spraying Experiments Against It. L. c. Pgs 129-140.

## INSECTS RECEIVED FOR IDENTIFICATION.

Oct. 1, 1906 to Oct. 31, 1908.

### COLEOPTERA.

SCIENTIFIC NAME.	FOOD.	LOCALITY AND DATE.
<i>Bruchus pisi</i> Linn.	Beans.	Pittsfield, V. 5, '08.
<i>Euphoria inda</i> Linn.	Apple.	Dover, IX, 16, '07.
<i>Galerucella luteola</i> Mull.	Elm.	Claremont, VII, 16, '07.
<i>Macrodactylus subspinosus</i> Linn.	Beans, corn.	Tilton, V. 29, '08.
<i>Meloe angusticollis</i> Say.	Onions.	Pittsfield, VII, 19, '07.
" " "	Potatoes.	New Ipswich, IX, 17, '07.
<i>Oberea bimaculata</i> Oliv.	Raspberry.	Wolfboro, VII, 24, '08.
<i>Pissodes strobi</i> Peck.	Pine.	Milford, VII, 28, '08.
" " "	Pine.	Hillsboro, VIII, 1, '08.
" " "	Spruce.	Dublin, VII, 11, '08.
<i>Prionus laticollis</i> Dru.		Dover, VI, 11, '08.
<i>Saperda candida</i> Fab.	Apple.	Dover, VII, 30, '07.
<i>Scolytus rugulosus</i> Ratz.	Apple.	Newton Jet., VI, 10, '08.
<i>Tenebriodes mauritanicus</i> Linn.		Chester, XI, 7, '07.
		Monadnock, X, 12, '07.

### HEMIPTERA.

SCIENTIFIC NAME.	FOOD.	LOCALITY AND DATE.
<i>Aphis gossypii</i> Glov.	Canteioupe.	Concord, VII, 27, '08.
<i>Aphis pomi</i> Fitch.	Apple.	Boscawen, VI, 1, '08.
<i>Aphrophora parallela</i> Say.	Pine.	Laconia, VI, 22, '08; VI, 23, '08.
		Farmington, VI, 22, '08.
		West Canaan, VI, 1, '08.

## HEMIPTERA.—Continued.

SCIENTIFIC NAME.	FOOD.	LOCALITY AND DATE.
<i>Aspidiotus perniciosus</i> Coms.	Apple.	Manchester, I, 7, '07. Chester, V, 1, '08. Rochester, X, 1, '08. Dover, V, 2, '07.
<i>Ceresa dubalus</i> Fab.	Apple.	Manchester, IV, 17, '07.
<i>Chionaspis furfurus</i> Fitch.	Apple.	No. Hampton, VII, 12, '08.
<i>Gossiparia ulmi</i> Fitch.	Elm.	Pittsfield, VI, 13, '08.
<i>Clostoptera pini</i> Fitch.	Pine.	Antrim, X, 14, '07.
<i>Lachnus strobi</i> Fitch.	Pine.	West Concord, XII, 2, '07. Hudson, IV, 20, '08.
<i>Lepidosaphes ulmi</i> Bouche.	Apple.	West Claremont, IV, 2, '07; Center Ossipee, IV, 8, '07; Hebron, IV, 11, '07; Bow, I, 23, '07; Wal- pole, I, 9, '08; Hampton, V, 13, '07; Concord, IV, 26, '08; Green- land Village, III, 22, '08; Goss- ville, XII, 26, '08; Portsmouth, IV, 29, '08; Candia, I, 24, '08; Laconia, VIII, 5, '08; Ports- mouth, V, 19, '08.
<i>Lygus pratensis</i> Linn.	Lilac.	Manchester, V, 28, '08.
<i>Melanoxanthus salicis</i> Linn.	Dahlia.	Epping, VIII, 27, '06.
<i>Nectarophora pisi</i> Kalt.	Willow.	Manchester, X, 27, '07.
<i>Perillus claudus</i> Say.	Pea.	Grafton, VII, 27, '08.
<i>Schizoneura americana</i> Riley.	Elm.	Ashland, VI, 22, '08.
" " "		Manchester, VII, 12, '07.
" " "		New Ipswich, VII, 8, '07.
<i>Schizoneura lanigera</i> Haus.	Apple.	West Claremont, XII, 5, '06.
" " "		Mt. Vernon, XII, 9, '07.
<i>Tingis juglandis</i> Fitch.		Berlin Mills, VIII, 27, '06.
		Orford, VII, 13, '08.

## HYMENOPTERA.

<i>Cimber americana</i> Lach.	Elm.	Dublin, VII, 31, '08.
<i>Eriocampoides limacina</i> Retz.	Cherry.	Weirs, IX, 6, '08.
<i>Lophyrus lecontei</i> Fitch.	Pine.	Holderness, VII, 27, '07.
<i>Thalessa lunata</i> Fab.		Laconia, VII, 24, '08.

## LEPIDOPTERA.

<i>Anisota rubicunda</i> Fab.	Maple.	Harrisville, VIII, 30, '07; Peter- boro, VII, 27, '08; New Lon- don, VII, 31, '08; Sullivan, VII, 31, '08; Laconia, VII, 28, '08; Andover, VII, 8, '08; Sanborn- ville, VII, 28, '08; Canaan, VIII, 19, '08; Ossipee, VII, 24, '08; Franklin, VIII, 24, '08; Laconia, VII, 24, '08.
<i>Anisota rubicunda</i> Fab.	Oak.	Centerville, VII, 2, '08; Conway Centre, VIII, 24, '08.
<i>Anisota stigma</i> Fab.	Maple.	Laconia, VII, 28, '08; Conway Centre, VIII, 8, '08.
" " "	Oak.	Center Harbor, VIII, 2, '08; Der- ry, VIII, 4, '08.
<i>Ampelophaga myron</i> Cram.	Grape.	Sanbornton, VIII, 5, '08.
" " "	Woodbine.	Sunapee, VII, 30, '08.
<i>Apantesis virgo</i> Cram.		East Hebron, V, 7, '06.
<i>Automeris</i> to Fab.		Conway, IX, 16, '07; South Lee, VI, 26, '07.
<i>Basilona imperialis</i> Dru.	Pine.	Atkinson, VII, 19, '07.
" " "		Hampton Falls, VI, 28, '07.

## LEPIDOPTERA.—Continued.

SCIENTIFIC NAME.	FOOD.	LOCALITY AND DATE.
<i>Cacoccia cerasivorana</i> Fitch.	Cherry.	Jackson, VII, 7, '07.
<i>Calocalpe undulata</i> Linn.	Cherry.	Harrisville, VIII, 30, '07.
<i>Ceratonia amyntor</i> Hub.		Canaan, IX, 19, '08.
<i>Clistocampa americana</i> Fab.	Apple.	Canaan, III, 15, '07.
" " "		East Hebron, VII, 22, '07.
<i>Datana integerrima</i> G. & R.	Walnut	Exeter, VIII, '07.
<i>Datana major</i> G. & R.		E. Jaffrey, VII, 15, '07; North
" " "		Weare, IX, 10, '08.
" " "	Apple.	New London, VIII, 22, '07.
" " "	Blueberry.	New London, VIII, 22, '07.
" " "	Walnut.	Dover, VIII, 20, '08.
<i>Datana ministra</i> Dru.		Canaan, IX, 8, '08; Antrim, VII,
" " "		18, '08.
" " "	Apple.	Bath, VII, 28, '07; Freedom, VII,
		22, '07; Conway Centre, VIII,
		29, '07; Enfield, IX, 11, '07;
		Sunapee, VII, 22, '07; Henniker,
		VIII, 11, '08.
<i>Danaus archippus</i> Linn.		Dover, VIII, 29, '08; Hillsboro,
		IX, 3, '08.
<i>Eacles imperialis</i> Dru.		Salisbury, VIII, 19, '08.
<i>Eugonia f-album</i> Bd.		Wilton, III, 25, '07.
<i>Euranessa antiopa</i> Linn.		Claremont, VII, 9, '08.
<i>Halesidota caryac</i> Harr.	Apple.	Harrisville, VIII, 30, '07; Dublin,
		VIII, 19, '07; New London, VIII,
		9, '07; Holderness, X, 19, '07;
		Hancock, VII, 30, '08.
<i>Halesidota caryac</i> Harr.	Birch.	Tilton, VIII, 25, '07.
" " "	Butternut.	Holderness, X, 19, '07.
" " "	Elm.	Claremont, VIII, 23, '07; Wolf-
" " "		boro, IX, 17, '07.
" " "	Hickory.	Franklin, VIII, 10, '07.
" " "	Oak.	Center Harbor, VII, 2, '08.
" " "	Walnut.	Holderness, VII, 27, '07; Exeter,
" " "		VII, 26, '07; Orford, IX, 16, '07.
" " "	Apple.	East Andover, VIII, 2, '07; Lake-
		view, IX, 13, '07; Boscawen,
		VIII, 28, '07; Holderness, X,
		19, '07; Pittsfield, VIII, 17, '07;
		Contoocook, VIII, 8, '07; Suna-
		pee, VIII, 22, '07; Hanover Cen-
		tre, IX, 10, '07.
<i>Halesidota caryac</i> Harr.		Walpole, VIII, 8, '07; No. Sutton,
		VIII, 25, '07; Chesterfield, VIII,
		19, '08; Suncook, IX, 16, '07;
		Franklin, VIII, 10, '07; Nashua,
		VIII, 2, '07.
<i>Halesidota tessellata</i> S. & A.		Bath, VIII, 27, '07.
<i>Hemerocampa leucostigma</i> S. & A.	Apple.	New Durham, III, 18, '07; Sut-
		ton, V, 5, '08; Rollinsford, VIII,
		28, '07; Salmon Falls, II, 24,
		'08; Warner, VI, 24, '07.
<i>Hemerocampa leucostigma</i> S. & A.	Apple.	Epping, III, 2, '07; West Ring,
		VI, 22, '07; Bath, VIII, 27, '07.
<i>Hyphantria cunea</i> Dru.		Mt. Sunapee, VIII, 12, '07; Ches-
" " "		terfield, VII, 7, '08.
" " "	Apple.	Woodsville, VII, 31, '07; Snow-
		ville, VIII, 19, '07; Winches-
		ter, VIII, 13, '07.
<i>Hyphantria <del>lestor</del></i> Harr.		Jackson, VII, 2, '08.
<i>Ichthyura inclusa</i> Hubn.	Apple.	East Wakefield, IX, 24, '07.
<i>Notolophus antiqua</i> Linn.	Poplar.	Dover, II, 18, '07; Warner, VI,
		21, '07; Hillsboro Bridge, V, 5,
		'07.

## LEPIDOPTERA.—Continued

SCIENTIFIC NAME.	FOOD.	LOCALITY AND DATE.
<i>Oedemasia concinna</i> S. & A.	Apple.	West Lebanon, IX, 17, '07; Strat- ham, VIII, 23, '07; Canaan, VIII, 19, '08; New London, VII, 31, '08; Center Harbor, VIII, 18, '08; E. Gratton, VIII, '08; West Rye, VII, 14, '07; East Andover, VIII, '07; No. Sutton, VII, 23, '07; Freedom, VII, 22, '07; Marlow, VIII, 26, '07; Contoocook, X, 1, '07; Warner, VIII, 12, '07; Laconia, X, 19, '07; Enfield, IX, 11, '07; Boscawen, VIII, 28, '07; Hook- sett, IX, 19, '07; Henniker, VIII, 20, '07; Peterboro, VIII, '07; New London, IX, 11, '07; Sunapee, VIII, 22, '07; Antrim, X, 7, '07; Walpole, IX, 10, '07; Franklin, VII, 15, '07.
<i>Papilio turnus</i> Linn.	Cherry.	New London, IX, 11, '07.
<i>Phobetron pithecium</i> S. & A.	Plum.	Westville, IX, '08.
"	"	Nashua, IX, 10, '07; New Dur- ham, IX, 1, '08.
<i>Samia cecropia</i> Linn.		Enfield, X, 10, '08; Chester, VIII, 27, '08; Sunapee, V, 8, '08; No. Haverhill, IX, 3, '07; Suncook, XI, 11, '07; Highlands, XI, 29, '07; Mason, III, 17, '08; Center Sandwich, II, 18, '08; Hopkin- ton, 1, 22, '08; West Campton, III, 3, '08.
<i>Samia cecropia</i> Linn.		Rollinsford, VII, 17, '08; Dover, IV, 28, '07; Salmon Falls, II, 24, '08; Greenville, II, '19, '07; Freemont, VIII, 15, '07; Antrim, IX, 3, '07; Ossipee Valley, XII, 4, '06; Hill, XI, 27, '06; New Boston, III, 24, '07; Hinsdale, III, 14, '07; Stratham, III, 25, '07; Hampton, IV, 4, '07; Whit- ton, III, 20, '07; Kingston, III, 19, '07; Bedford, XII, 20, '06; Enfield, XII, 10, '06; Candia, III, 16, '07; Alton Bay, III, 1, '07.
<i>Samia promythia</i> Dru.	Apple.	Newton, V, 20, '07.
"	"	New Durham, III, 27, '07; Ches- ter, I, 27, '08; Highlands, XI, 29, '07; Rollinsford, IV, 2, '08; Enfield, XII, 5, '06.
<i>Sphinx drupiferarum</i> S. & A.	Apple.	No. Haverhill, VIII, 30, '07.
"	"	Hollis, VI, 22, '07.
<i>Thyreus abbottii</i> Swan.	Woodbine.	Wolfeboro, VIII, 10, '07.
"	"	W. Henniker, VIII, 5, '07; Con- cord, VIII, 5, '07; Whitefield, VII, 29, '08.
<i>Thyridopteryx ephemeraeformis</i> Harr.	Arbor vitae.	Hillsboro Bridge, X, 4, '06.
<i>Tortrix fumiferana</i> Cle.	Spruce.	Laconia, VIII, 9, '07.
<i>Aetia luna</i> Linn.		Enfield, VI, 15, '08; East Unity, VII, 5, '07.
NEUROPTERA.		
<i>Corydalis cornuta</i> Linn.		Contoocook, VII, 26, '08.
ACARINA.		
<i>Phytoptus pyri</i> Sch.	Pear.	Weirs, VIII, 5, '07; Concord, VIII, 15, '07.
<i>Dermanyssus gallinae</i> Redi.	Chickens.	Bristol, VII, 5, '07.



## CODLING MOTH INVESTIGATIONS.

A popular account of the work upon the codling moth of 1905 and 1906 was published in Bulletin 131. Since then more elaborate experiments in control have been made and the studies of the life history have been repeated. In the present report the data accumulated during the years 1905, 1906, 1907 and 1908 will be presented. Although there are still many phases of the life history and habits of the codling moth not fully



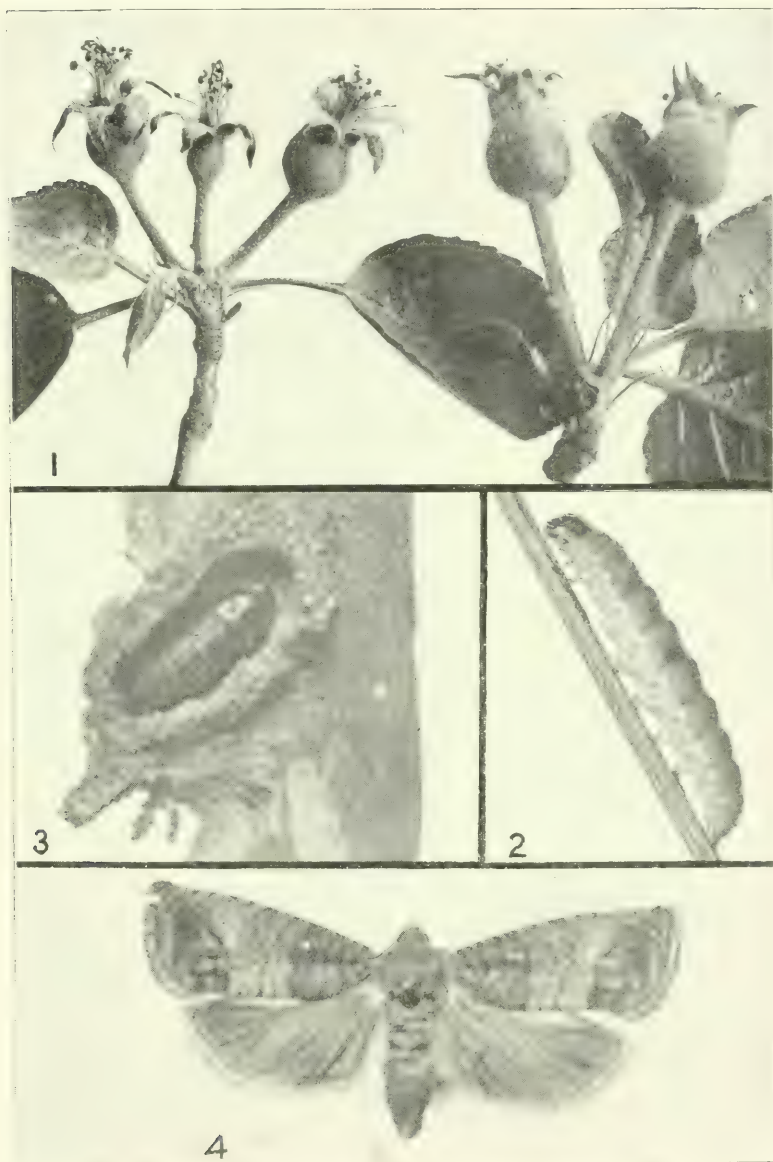
FIG. 18. The codling moth.

known, and although further studies of the effect of various kinds of sprays would be of interest, it is felt that the studies of the past four years have brought out the essential points as regards habits and means of control of this most important pest of the apple, and this report will probably conclude our work

upon it for the present. In carrying out the details of the work the writer has been assisted by Dr. T. J. Headlee, C. S. Spooner, and C. F. Jackson, who have been immediately responsible for the observations and records, and to whom much credit is due for careful work.

## LIFE HISTORY.

*Hibernation.* The larvae hibernate over winter in cocoons which are located mostly in the bark of the trunk and limbs of the trees. Usually the larva mines into the corky wood of a crevice in the bark, and there spins its cocoon. Rarely are cocoons found under loose flakes of bark, although larvae will readily spin up in burlap bands, under an old bag, in the crotch, etc. Occasionally cocoons may be formed under clods of earth, and, probably often under boards, rubbish, fences, etc., but we have observed few in such situations in the orchards under observation. In May, 1907, a careful study of seven trees in a badly infested old orchard was made to determine the position of the cocoons on the trees, as well as the condition of the larvae. Out of 385 cocoons found on the seven trees, 70 per cent. were on the trunk and the remainder on the main branches.



## THE CODLING MOTH AND ITS CONTROL.

Fig. 1.—Young apples, showing, on left, calyx lobes open, and in right condition for first spraying; on right, calyx lobes closed, and almost, if not quite, too late for spraying. Fig. 2.—The codling moth larva, or apple worm. Fig. 3.—Codling moth pupa, in its cocoon, under scale of bark from trunk of apple tree. Fig. 4.—Codling moth or parent of apple worm. Figures 2, 3, and 4 enlarged about three times. (After Quaintance, U. S. Dept. Agr.)



Of those on the trunk 97 were within one foot of the crotch, 112 were within one foot of the ground, and 60 were between on the middle portion of the trunk. In counts of larvae collected from

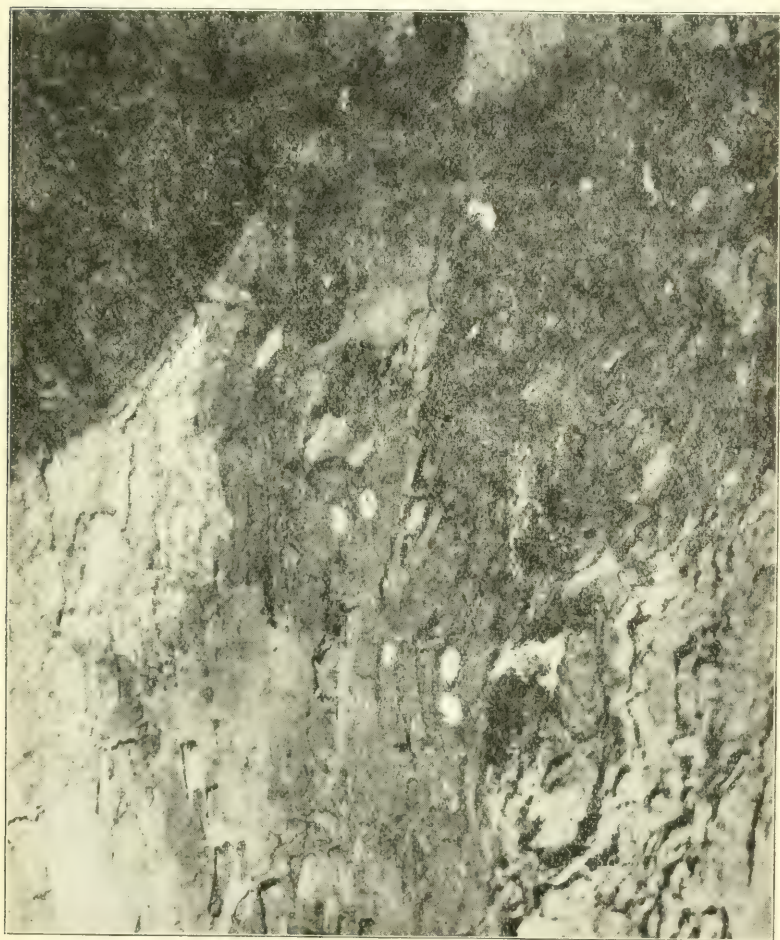


FIG. 19. Remains of the white cocoons of the codling moth revealed by scraping off the bark covering them.

bands on nine unsprayed trees the same season it was found that out of 640 larvae 58 per cent. were from the lower bands, where one band was placed just below the crotch and another

just above the ground. We have frequently observed more larvae at the base than higher on the tree. On these seven trees were 51 limbs, but on only 26, or one-half of the limbs, were any larvae found. On each limb the distance of the larva farthest from the base of the limb was noted, and this varied from one to ten feet, with an average of 3 feet 8 inches. It is therefore safe to assert that the larvae are usually found only on the larger limbs within about three feet of the crotch.

At the same time a record was made of the condition of the larva in each cocoon and the cause of mortality, as far as it could be determined. The following table gives the record of the 7 trees:

TABLE 1. *Giving mortality of codling moth larvae during hibernation.*

Tree.	Total larvae on trunks.	Alive.	Killed by—		
			Birds.	Fungus.	Cold.
1.	36	4	28	0	4
2.	46	2	42	2	0
3.	41	3	33	2	3
4.	25	1	22	1	1
5.	74	2	67	5	0
6.	35	2	31	1	1
7.	12	0	11	1	0
Total per tree, 38.5		14 5%	234 87%	12 4%	9 3%

In another badly infested orchard 1096 cocoons were examined during May 1907. In these 19 per cent. were alive, 66 per cent. had been killed by birds, 6 per cent. had been killed by fungus and 9 per cent. by cold. Very often when seeking larvae in the spring it is difficult to find living specimens as practically every cocoon has been emptied by the woodpeckers. It is quite evident, therefore, that the birds are the most important natural enemies of the codling moth in New England, and should be given every protection and attracted to the orchard in every way possible.

*Pupation.* In 1906 the average date of pupation for 43 larvae was May 25, and the average length of the pupal stage 20 days, the majority of the adults appearing about June 14. In 1907 the average date of pupation for 103 larvae was June 16, the average length of the pupal stage being 16 days and the majority of the adults appearing about July 2. The larvae observed in both



the above years, were collected from trees in the spring and kept in an unheated room with windows open. In 1908 83 larvae were secured in the same way and kept under similar conditions. The time of pupation and emergence is shown in Table 2. It will be noted that the first larva pupated May 20, the last June 9, and the average about June 1. The average length of the pupal stage was 19 days, the majority of the moths emerging about June 20.

TABLE 2. *Pupation and emergence of the Codling Moth; larvae collected May 13, 1908.*

Pupated—		Time Pupa—			Moths Emerged—	
Date.	Number.	Average.	Minimum.	Maximum.	Date.	Number.
May 20	1	17			June 6	1
" 21	2	21			" 11	1
" 23	3	21	21	22	" 13	5
" 25	5	20 1-2	19	21	" 14	3
" 26	7	20			" 15	12
" 27	4	20	19	21	" 16	5
" 28	11	19 1-3	16	22	" 17	5
" 29	8	20	17	21	" 18	2
June 1	28	19	16	20	" 19	17
" 3	1	16			" 20	13
" 6	2	15			" 21	9
" 7	7	15	14	16	" 22	4
" 8	2	16 1-2	16	17	" 23	2
" 9	2	16			" 24	1
					" 25	3

137 larvae had been collected in August and September, 1907, from the same trees as the above, the larvae collected from these trees in May, 1908, having all spun up after Sept. 21, 1907, when the last were collected. Those collected in the fall were placed in gelatin capsules and kept in a dry, wooden box in a pine grove all winter, and were brought into the same quarters as those collected in May, at the same time. As will be seen in Table 3 they emerged a week or ten days later than those collected in May, and the pupal stage lasted but 16 days against 19 days, corresponding exactly with the time of the pupal stage in 1907. Furthermore those collected Aug. 19, 1907, pupated slightly before those collected Aug. 29, and those collected in August pupated five or six days earlier than those collected Sept. 21. The same is more markedly true of the time of emergence of the moths, the earlier collections emerging earlier, there being about a week difference in the time of emergence between those collected Aug. 19 and Sept. 21.



TABLE 3. *Pupation and emergence of Codling Moth larvae collected during August and September, 1907.*

Date	Total Number	Pupated			Time Pupa.		
		Coll. 8-19	Coll. 8-29	Coll. 9-21	Average	Maximum	Minimum
May 18	3		3		23		
" 19	2			1	22		
" 20	1			1	17		
" 21	1	1			21		
" 23	3		3		21		
" 25	4	3	1		21		
" 26	4	1	3		20		
" 27	1		1		23		
" 28	10	3	6	1	20	19	21
" 29	3	1	1	1	21 $\frac{1}{2}$	21	22
June 1	19	5	13	1	19	18	20
" 3	1	$\frac{1}{2}$			18		
" 4	6		5	1	18	17	19
" 6	4	1	2	1	16 $\frac{1}{2}$	15	17
" 7	9	2	7		16 $\frac{1}{2}$	15	18
" 8	4		2	2	15 $\frac{1}{2}$	15	16
" 9	5		$\frac{2}{2}$	3	16	14	17
" 10	10	2	7	1	16.8	16	17
" 11	4		4	$\frac{1}{2}$	17	16	18
" 12	7		5	2	17	16	18
" 14	15	$\frac{3}{4}$	13 $\frac{3}{4}$	1	16 $\frac{1}{2}$	15	17
" 15	1		1		16		
" 16	8	2	3	3	15	11	17
" 17	2	1		1	16	15	17
" 19	1		1	$\frac{3}{4}$	15		
" 20	1			1	16		
" 21	1	1			15		
" 22	1			1	15		
" 23	6	2	1	3	13	10	14

Date.	Total Number.	Moths Emerged.			
		Coll. 8-19.	Coll. 8-29	Coll. 9-21.	
June 11	1	1			
" 13	4	2	2		
" 14	2	1	1		
" 15	8		8		
" 16	3	1	1		1
" 17	4	1	3		
" 18	1		1		
" 19	9	3	5		1
" 20	10	3	6		1
" 21	8	$\frac{1}{2}$	6		
" 22	5	1	3		1
" 23	12	1	8		3
" 24	6		$\frac{1}{2}$		2
" 25	4	2	1		1
" 26	2		1		1
" 27	8	$\frac{3}{4}$	5		$\frac{1}{2}$
" 28	6	1	5		2
" 29	4		4		1
" 30	1		$\frac{3}{4}$		1
July 1	9	1	8		$\frac{3}{4}$
" 2	8	1	6		1
" 3	5	1	3		1
" 4	4	3			1
" 6	2		2		
" 7	3				3

TABLE 4. *Duration of the Pupal Stage of the Codling Moth.*

A. Raised in insectary room; average temperature 70° F.

Date pupated 1908.	Collected May 13			Collected Aug. 19			Collected Aug. 29			Collected Sept 21.		
	1 No.	2 Days.	3 Temp.	No.	Days.	Temp.	No.	Days.	Temp.	No.	Days.	Temp.
May 21				1	22	773						
" 23							2	24	785			
							1	22	828			
" 25	1	21	798	1	19	713	1	21	798			
				1	20	755						
				1	21	798						
" 26	3	20	760	1	20	760	3	20	760			
" 27	2	20	752				1	19	714			
	1	21	787				1	23	863			
" 28	1	16	594				1	16	594			
	2	19	717	1	19	717	1	19	717	1	19	717
	2	20	752	1	20	752	3	20	752			
	2	21	787				1	21	787			
	2	22	828	1	22	828						
" 29	1	18	683				1	17	645			
	6	21	794	1	21	794	1	21	794	1	22	834
June 1	1	17	609	1	18	685	3	18	685	1	18	685
	8	18	685									
	13	19	725	3	19	725	6	19	725			
	6	20	763	1	20	763	4	20	763			
" 3	1	16	623	1	19	739						
" 4							2	17	667			
							2	18	705			
							1	19	744	1	19	744
" 6	1	14	566									
	2	15	603	1	15	603	2	17	680	1	17	680
" 7	4	15	604				1	15	604	1	15	604
	2	16	643	1	16	643	3	16	643			
				1	18	713	3	17	678			
" 8	1	16	624				1	15	601	1	15	601
	1	17	661				1	16	626	1	16	626
" 9	2	16	626				1	14	554	1	15	589
							1	16	624	1	16	624
										1	17	660
" 10	1	15	580									
	3	16	616	1	16	616	2	16	616			
	1	17	648	1	17	648	4	17	648	1	17	648
							2	18	680			
" 11	1	17	639				2	17	639			
	1	18	671				1	18	674			
" 12	1	17	634				1	16	599			
							2	17	634	1	17	634
							2	18	672	1	18	672
" 14				1	17	625	1	15	554			
							7	16	590			
" 15							5	17	625	1	17	625
							1	16	582			
" 16	1	17	622	1	17	622	1	15	544	1	11	404
							3	16	584	1	15	544
" 17				1	15	549				1	16	584
" 19				1	15	550				1	17	626
" 20				1	16	599						
" 21				1	15	561						
" 23				1	13	484	1	11	395	1	15	571
Weighed Average of 7—18.5.				Wt. Average 27—18			Wt. Average 83—17.6.			Wt. Average 20—16.6.		

## B. Raised in Laboratory; average temperature 71° F.

Date pupated 1908.	Collected May 13			Date pupated 1908.	Collected May 13		
	1 No.	2 Days.	3 Temp.		1 No.	2 Days.	3 Temp.
May 11	1	30	1145	May 27	3	14	545
" 15	1	26	1011		2	15	588
" 17	1	24	922		1	17	676
" 18	3	20	787	May 28	1	11	412
" 23	1	16	616		3	13	505
	1	18	709		5	14	548
" 25	1	12	459		1	15	592
	2	13	497	" 29	1	11	420
	1	15	585		1	12	467
	1	16	632		3	13	510
" 26	2	12	456		1	14	554
	1	14	545		2	15	598
	3	15	591	June 1	1	14	576
" 27	1	13	498				
							Weighted average 45—15.1
							Total weighted ave. 249—16. Days

Note:—1. Number pupated.

2. Days pupated.

3. Total temperature above 32° F.

*Relation of Temperature to Pupal Stage.* Table 4 shows the number of larvae which pupated each day, the number of days in the pupal stage and the total accumulated temperature above 32 degrees F. during that time. The lots are divided according to the time collected, for convenience in comparison. One lot collected in May was placed in the zoological laboratory, which was thought to be a warmer room. The thermograph records show that it averaged 71 degrees against 70 degrees in the basement room in which the rest were kept, but that the temperature was somewhat more uniform. Why the pupae in the laboratory should emerge in an average of 15.1 days while those in the basement should require 17.7 days, with a corresponding amount of total temperature, is a mystery. It will also be observed that the amount of temperature required varies with the number of days pupa, as the average temperature of the rooms was practically constant during the period, but that the first to pupate required several more days than those pupating last, there being a regular decrease in the number of days in the pupal stage and the temperature increment from the first to the last pupation. Also there is a difference of five or six days in the length of the pupal stage of individuals pupating on the same day. Were not our records exactly paralleled by those of Simpson (Bull. 41, Div. Ent., Tables IV. and V.), we would have doubted their accuracy, but there seems no good reason for such suspicion. It is to be regretted that the records were not made out of doors under natural conditions, and further

studies of the relation of temperature to the transformations of the codling moth will be made under natural conditions, but as Simpson's cages were placed under exactly the same conditions as prevailed in the orchard, there is reason to believe that the transformations of this insect are quite variable, and that other factors than temperature are of great importance. It will be observed, however, that although there seems to be no definite heat increment which will cause the emergence of the codling

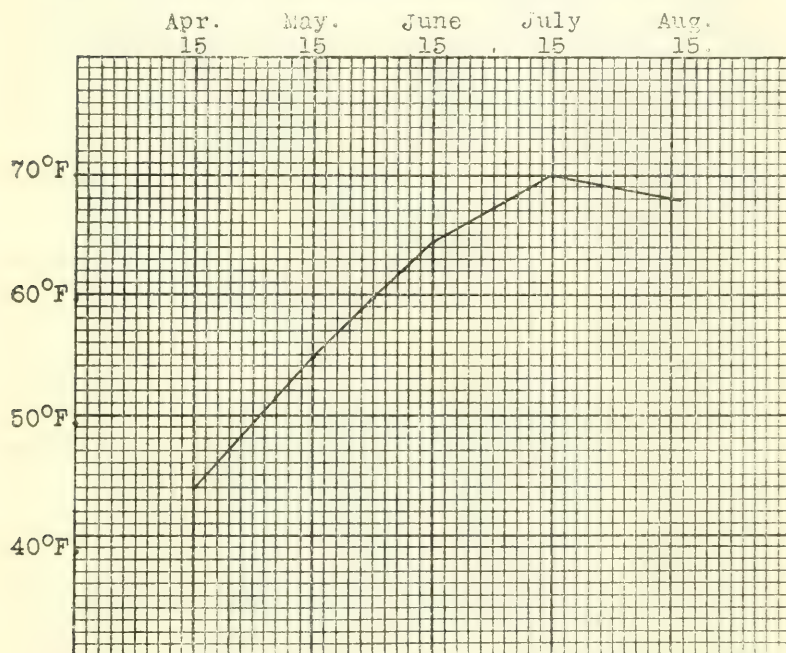


FIG. 20. Curve showing average mean temperature at Durham, N. H.

moth, yet, if the average of all the records are taken, there is an approximately regular decrease in the number of pupal days of about one day for every seven days later in the season. Fig. 20 shows the normal curve for the mean monthly temperatures at Durham, N. H. From it may readily be determined the heat increment above 32 degrees for a given number of days at any point. It will be found that a pupal period, commencing on May 25 of 18 days, on June 1 of 17 days, on June 4 of 16 days, and on June 15 of 15 days, will require a total normal temper-

ature of 470 to 480 degrees, which is practically a thermal constant. The number of days required for the pupa from these different dates corresponds fairly well with the average of all those recorded in the above tables. It would seem then that the emergence in an abnormally high and uniform temperature requires about the same length of time as it would out of doors, and that other factors than temperature must control the time of pupation and emergence. Other studies of the relation of the codling moth to temperature conducted in greenhouses during the winter, and not yet ready for publication, indicate the same fact. The average length of the pupal stage of 249 individuals is found to be 16 days. Simpson gives 22 days for the cocoon stage and states that the larva exists in the cocoon six days before pupating. All of our observations were made on individuals in glass vials, which enabled us to give the exact date of pupation. Thus the average time agrees exactly, as an addition of six days to our average of 16 gives 22 as made by Simpson. It should be noted that our records are of the hibernating brood of larvae, whereas those of Simpson and others seem all to be made on the summer brood pupating in early August.

TABLE 5. *Relation of time of emergence of Codling Moth to dropping of apple blossoms.*

Year.	Petals fell.	First moth.	Majority moths.	Last moth.	Days first eggs hatch after petals fell.	Days majority hatch after petals fell.
1906.	May 29	June 9	June 14	June 26	21	26 (*10)
1907.	June 12	" 13	July 2	July 8	11	30 (*19)
1908.	May 26	" 6	June 19	June 25	21	30 (* 7)

*Time of Emergence of Moths.* The fact that the larvae which mature and cocoon first transform and emerge first the next spring, is of significance in connection with the amount of damage done by the second brood, and its prevention. The moths emerging first give rise to the few larvae which mature and form the partial second brood, which does considerable damage. If the drops were destroyed in August of the previous year, there would be fewer early moths and less of the second brood the next year.

Table 5 shows the relation of the time of appearance of the moths to the time of the apple blossoms dropping. It is usual to give the first spraying for the codling moth just after the petals drop. Moths do not usually oviposit until four to six days after emerging, and continue to oviposit for from ten to

\*Days in egg stage.



thirty days, but if we assume that all the eggs are laid as soon as the moths emerge, and that they hatch in 10 days, we find that the first eggs would not hatch until about three weeks, and the majority of eggs not until about four weeks after the blossoms fall. This is of importance as determining the time of the second spraying to catch the newly hatched larvae on the freshly-poisoned foliage, and shows that it may usually be given about three to four weeks after the petals drop.

*Length of Life of Moth.* Simpson has given the average life of 47 moths as 4 days, but as egg records were secured from but two of these moths, and as they received no food or water, it is evident that they were under extremely unnatural conditions. Slingerland states that he has observed a moth for 17 days. In 1906 we erected three large cages covered with cheese cloth (Fig. 21) covering trees 10 to 12 feet high. These were placed over the trees before moths had commenced to emerge, and the leaves were carefully examined to see that no eggs had been laid before the moths were introduced. A pair of moths was then introduced into each of the three cages. It was im-

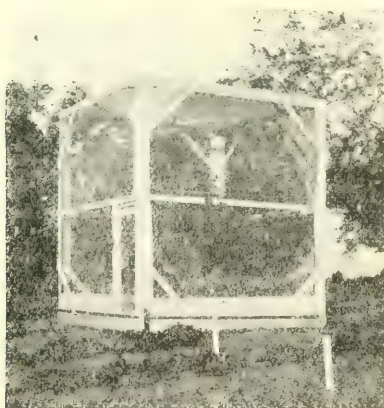


FIG. 21.—One of the large cages used in the study of the apple worm.

possible to follow the individual moth in so large a cage, but frequent examination of the foliage showed the number of eggs laid and the approximate date at which they were laid, thus giving a very correct idea of the length of life of the moth. In one case a moth was actually observed in the cage about three



weeks after its introduction. Our records of moths which failed to oviposit or deposited merely a few eggs would confirm Simpson's records, but the six moths which have laid a considerable number of eggs and lived under fairly normal conditions, lived from 5 to 28 days, averaging 13 days.

*Oviposition.* If the evenings be warm when female moths emerge, they will oviposit in three to five days after emergence. But if the evenings be cool, egg laying will sometimes be deferred for several days. From June 9 to 15, 1906, we were able to secure eggs, but after that the evenings were cool until the latter part of the month, and no eggs were secured until June 28. In 1907 no eggs were secured until June 22 or about the time of the maximum emergence of moths, though moths had been emerging since June 10, and had been paired in cages as fast as

emerging. Owing to the extreme difficulty with which oviposition is secured with moths confined, it is difficult to determine the probable average period of oviposition. The period of oviposition for four moths, of which we have accurate records, not counting a large number which laid less than 10 eggs, varies from two to twelve days, averaging about eight days, but as indicated above in discussing the length of life, this will depend very largely upon the temperature. This is further shown by

field records. Each year records were made of eggs on young bearing trees to determine their location, as described below, and incidentally the condition of the eggs was noted, so that the date of oviposition can be quite closely approximated. In 1906, though the last moths emerged June 26, but few eggs could be found until after July 5. In 1907, the majority of moths emerged July 2, and the last July 8, in confinement. Most all eggs were found hatched in the field on July 12, showing that they were laid about July 1 to 5, but 32 out of 246 were unhatched on July 14, and three were unhatched July 20. In 1908 eggs were laid in confinement from June 22 to July 8, but on three trees examined every two days, they were laid from June 18 to July 14, the maximum being about July 1. From the three years' observations it seems safe to assert that in this climate the eggs are usually laid about July 1, though the exact time will depend upon the fluctuations of the season. It is also evident from our records that eggs are being laid by different individuals for about one month.



FIG. 22. Codling moth egg on apple, about natural size.

Out of, probably, over 100 female moths placed with males during our three years' observations but 15 have oviposited at all, and of these but five have laid over 15 eggs. These five laid 29, 52, 58, 89, and 136 respectively, averaging 73. The females placed in the large outdoor cages in 1906 gave 29, 58 and 89, averaging 59. The individual which laid 136 in 1908, was fed on moistened sugar in a small cage in an open room, as were all others that year. Eight other females laid forty eggs, varying from one to thirteen, averaging 5, in 1908. In 1907 we were wholly unable to secure any oviposition. Records by previous observers range from 2 to 85 eggs, the general opinion seeming to be that about 50 may be laid. It would seem safe to assert from the above, that at least 60 to 75 eggs are usually laid and probably often 100 or more. Many of the eggs seem to be sterile or fail to hatch as in 176 observed in 1908, only 66 hatched.

*Position of Eggs.* Records have been kept of the position of the eggs on three trees for three years. These records were made by examining every leaf, stem, and apple on each of the trees every few days during the period of oviposition, and noting the distance of the egg from the tip of the branch, and from the nearest apple and whether it was on the upper or under surface of the leaf, fruit, or bark. 796 eggs have been recorded in the three years and their position is shown in Table 6. The records of the three trees in 1906 are of particular interest, as these trees were enclosed and the eggs on each were deposited by one moth, while in 1907 and 1908 the records were taken from trees in the open. All of the records, except as indicated, are from summer or fall varieties of apples, from trees ten to twelve feet high.

TABLE 6. *Position of eggs of the Codling Moth.*

Year.	Tree.	Number eggs.	Average distance to apple.	On upper leaf.	On lower leaf.	On fruit.
1906.	1	58	28 in.	4	54	
	2	29	4.71	23	2	4 on bark.
	3	69	16.48	22	36	5 on fruit. 1 on bark.
1907.	1	246	7	29	227	
	2	31	0	9	22	
	3	209	9.4	119	86	
	4	33	2.6	14	17	2 on fruit.
1908.	1, 2, 3	46	12	41	5	
1906 in indoor cages.		77		44	33	1
			Weighted			7 on fruit.
Total.		796	9 inches.	305	482	5 on bark

It is evident that the eggs are not usually laid on leaves immediately next to the apples. Large numbers are laid on foliage of non-bearing limbs. On the tree bearing 58 eggs in 1906, 22 were on branches having no apples, and in 1907 we found 31 eggs on a tree with no fruit whatever. It is, of course, perfectly evident, as has been shown by Card, Ball, and others, that practically all the eggs of this first brood are laid on the foliage. The eggs seem to be laid indifferently on the upper or under surface of the leaves when the under surface is smooth, but avoiding the under surface when fuzzy. The distance to the nearest apple is a matter of practical importance in relation to the habits of the young larva and spraying for its destruction, and is shown to be about 9 inches. In 1907 and 1908 an effort was made to determine whether the distance from an apple to the nearest egg would influence the infestation of the apple. To determine this the eggs on three trees, as recorded in Table 5, were found and each one numbered with a string tag. The apple nearest to each egg was then determined and numbered and recorded. On the stem of the apple was placed a tag bearing its number and the distance to the nearest egg, with the egg number. As the apples dropped the tags went with them and were collected every few days, and the record of the picked fruit was also made. A careful study of the records for three seasons fails to show that the distance of the nearest egg bears any relation to the worminess of the apple. The average distance for the nearest egg from wormy and non-wormy apples is practically the same. Wormy apples are found where the nearest egg was a foot or more distant, and others were not wormy where there were eggs within two or three inches. These observations would indicate that there must be a very large mortality of young larvae between the eggs and the apples.

*Duration of Egg Stage.* The rearing work was carried on in a basement room with open windows in 1908, and a comparison of thermograph records kept there, with the official records taken by the station, shows the mean temperature to be practically the same but with slightly less diurnal variations indoors.



One of the large frames used to cover one side of a tree by opening one side for the admission of a large limb.  
Limb cage used in life history studies of the codling moth.







FIG. 1. Egg of codling moth on leaf—greatly enlarged and natural size.



FIG. 2. Young codling moth larva just hatched with egg shell—enlarged.



FIG. 3.—Empty pupa case of codling moth, showing tube spun out from cocoon by larva (cotton to which cocoon was attached forming background.)





TABLE 7. *Duration of egg stage of the Codling Moth.*

Date Laid.	Number Laid.	Date Hatched.	Number Hatched.	Incubation Period Days.	Average Temp. °F	Total Over 32°F	Total Over 43°F
1906							
June 10	51	June 10	50	10	*64	323	213
June 27	20	July 4	16	7	*74	263	216
1908							
June 22	43	July 2	2	10	67.5	355	245
" 23	49	" 1	9	8	67	281	193
" 24	42	" 1	2	7	67	246	169
" 25	140	" 2	20	7	67	246	169
" 27	47	" 4	1	7	69	264	87
" 28	118	" 4	10	6	69	229	163
July 2	111	" 7	7	5	73	206	151
June 24	1	" 2	1	8	67	281	193
" 26	1	" 2	1	6	67	210	144
" 26	10	" 3	2	7	68	250	173
Total and Weighted Averages			118	8.2	67	286	196

With practically the same average mean temperatures Simpson found that it required an average of 11 days with 302 degrees F. above 43 degrees F., to incubate the eggs. Gillette's records agree fairly well with our observations. Two reasons for this discrepancy may be suggested. Simpson's work was done out of doors, presumably in an orchard from his account, whereas the weather records quoted are those of the Weather Bureau at Boise, Idaho, which is doubtless located on top of a building in the city. Temperatures would probably be considerably lower on the leaves during mid-day than in the city. Again, the temperatures in the room used by us in 1908 did not have so great diurnal fluctuations, although the mean was practically the same as out of doors. Our knowledge of the influence of temperature upon the transformations of insects is so limited that we can not state whether a more uniform temperature would conduce to more rapid incubation, but it seems entirely probable. The great difficulty with which codling moth eggs are secured under anything like normal conditions from fairly normal females, renders it almost impossible to secure really accurate data upon this point without more effort than the subject warrants. At least a thousand eggs would need to be recorded, before any very reliable conclusions as regards the relation of temperature could be made, and until we know more

\*No record of temperature was kept in this room which was unheated, with windows open. A comparison of thermograph records kept in the same room under same conditions in 1907 shows that it averaged about 5 degrees F. warmer than the official weather records of the station. By adding 5 degrees to the temperatures of the dates involved the average temperature given is secured.

†All laid by one female.

of the relation of temperature to species which breed more readily in confinement, it seems hardly worth while to attempt further study of this point. It is safe to assert that the eggs usually hatch in from seven to ten days. The only other conclusion which seems fairly evident from Simpson's observations and those above, is that the eggs are deposited at different stages of embryonic development.

*Feeding Habits of the Young Larvae.* Upon hatching from the eggs the young larva first feeds upon the foliage, mining



FIG. 23. Waterspouts of apple tunelled by codling moth larvae.

into the leaf at the angles of the mid-rib and branch veins, and gnawing the softer portions of the surface, more often on the under surface. This has been repeatedly observed, both in the laboratory and in the field. Whether larvae normally mature on foliage alone has not been determined from field observations, but we have shown that they will mature on foliage alone in the laboratory or in outside breeding cages, and it seems highly probable that when no fruit is available that larvae might mature on

foliage alone. This view is supported by the fact that considerable numbers of eggs are found on limbs bearing no apples on trees with no fruit. July 4, 1906, a larva just hatched was placed on a water sprout by Dr. Headlee. It tunneled the tip of the sprout (see Fig. 23) and finally constructed a cocoon in the cork of the rearing tube on July 21, and pupated July 26. On June 19, 1908, Mr. Jackson isolated six male and six female moths in a large limb cage, which were provided with sweetened water and left undisturbed. On July 9 the first examination was made and six half grown larvae were found feeding in the tips of water sprouts, on the leaves, and in the bark. On July 13 three practically full grown larvae were found, each buried in the end of a twig which was fast dying. One larva was removed to a fresh twig in a glass cylinder indoors. On July 16 these larvae had destroyed all the green foliage available and had escaped, except one which was living in a tunnel 5 inches long through the center of a twig. This larva was feeding in the laboratory on the surface of leaves on July 29, but subsequently died on Aug. 8. Two larvae which hatched July 2 in the laboratory, were fed entirely on foliage and spun up July 24 and 27. From the readiness with which the larvae under observation have subsisted on tender foliage and sprouts we believe there is no question but that the larvae may sometimes mature on them.

On July 1 and 2, 1908, Mr. Jackson placed freshly hatched larvae upon apples and watched their first feeding habits incidental to securing the length of time the larvae remained in the apple. His observations show that most individuals entered the calyx within a minute, but that occasionally one will wander around for some time, even as much as an hour, before entering the calyx. When a gash was cut in the side of an apple the larva at once entered it. All the larvae crawled aimlessly about until reaching some such protection as the overhanging calyx lobes. The younger the larvae, the longer they wander about before finding a place to enter the apple. The older larvae would at once cut through the calyx lobes into the calyx cavity, entering the upper or lower calyx cavity, or crawl up over the lobes and down into the calyx cavity. The younger larvae might come to the calyx a number of times and leave again. All larvae fed in or around the calyx cavity for some time. It was evident from the readiness with which the young larvae fed on foliage, and the aimless manner in which they crawled around on the smooth surface of the apple, that the foliage is the normal food of the young larvae before they enter the ap-

ples. These observations were first made personally by the writer in 1906, and have been confirmed by his assistants in 1907 and 1908. Any disturbance of the newly hatched larvae seems to be quite hazardous, as those disturbed usually die.

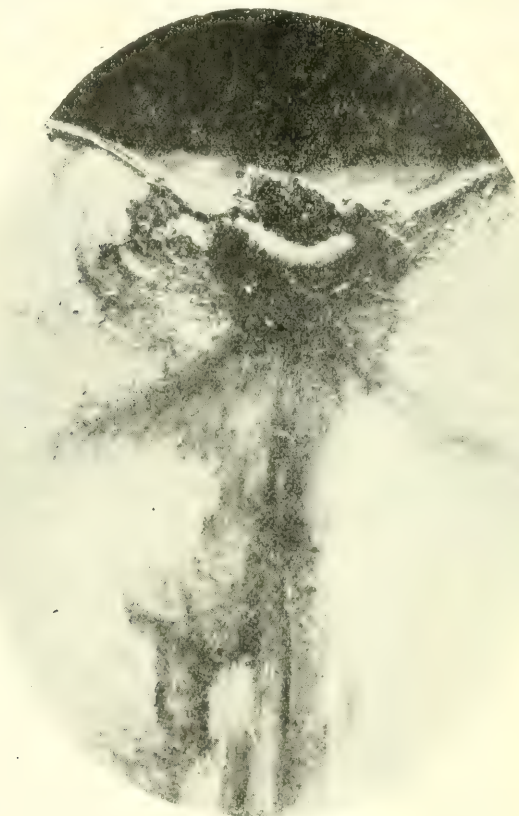


FIG. 24.—The young apple worm feeding in the calyx cavity of the apple.

*Place of Entering Apple.* Previous investigations have shown that the great majority of the larvae enter the apples at the calyx end. Tables 15, 16 and 17 give the percentage of larvae entering at the calyx and side (including stem) for both first and second broods. The nine orchards in which records were kept show a variation of from 39 to 77 per cent. of the first brood entering the calyx on unsprayed trees, with an average of 65 per cent., while of the second brood from 22 to 79 per

cent. enter the calyx, averaging 46 per cent. The cause of so many more larvae of the second brood entering the side rather than the calyx is rather obscure, but seems to be related to the size of the second brood there being less injury through the calyx with a small second brood. Simpson gives an average of 81 per cent. of the first brood entering the calyx; Ball finds 66 per cent. of the first and 60 per cent. of the second broods entering the calyx in Utah; and Petit gives 70 per cent. of the first and 65 per cent. of the second broods as entering the calyx. These average 72 per cent. of the first brood, which is not far from the average we secure here, with rather a larger amount of data than any of the previous writers.

*Length of Time in the Apple.* In 1906 record of the time seven larvae were in apples was secured by placing an egg just ready to hatch in the calyx of an apple and covering it with a cheese-cloth bag, and then noting the time of emergence of the larva. The time in the apple was thus determined quite accurately, under normal conditions. The seven averaged 31.8 days. In 1907 the same method was employed, but not as successfully, the records of only four being secured, which averaged 34 days. In 1908 the larvae were placed on apples as soon as hatched and the time of their entering the apple was noted, but the apples were kept in the insectary room and were not under normal conditions. Under these conditions ten larvae averaged 24 1-2 days in apples. The temperature conditions in the room were practically the same as out of doors. These observations would indicate that from 25 to 30 days are usually spent in the apple in this region. Simpson records observations on four larvae in Idaho and of four in Colorado by Gillette which average 19 days, and quotes LeBaron as giving the time as four weeks; Riley, 25 to 30 days; Slingerland, 20 to 30 days; Card, 10 to 14 days; and Cordley, 16 to 24 days.

*Time of Forming Cocoon.* Some of those larvae which emerge first pupate and emerge as a small partial second brood of moths. Our breeding records are not as satisfactory on this point as might be desired, for in 1906 and 1908 we were unable to secure any pupae from bands placed on trees, while in 1907, a season which was two weeks later, 20 pupae were secured. It may be that the bands were applied too late in 1906 and 1908, but this seems hardly probable, as the progeny of the first moths to emerge could hardly mature much before Aug. 1. Each season several trees have been banded and the larvae collected at frequent intervals. In 1906, 30 trees at Bayside, Greenland, N. H., were examined and showed as follows:



1906.	Aug. 18,	25.	Sept. 6.	14.	Oct. 10.	
	0	15	21	8	28	Total, 72.

Sixty-six trees in the orchard of Albert DeMeritt at Durham, were also examined and showed the following:

July 28.	30.	Aug. 1.	2.	23.	27.	Sept. 1.	8.	12.	15.	Sept. 26 to Oct. 2.	Oct. 11.	
2	1	1	3	22	24	21	16	17	15	209		74
Total, 397.												

In 1907 the nine unsprayed trees in Gilman Woodman's orchard at Durham were examined with the following results:

Aug. 8-9.	Aug. 15.	Aug. 19.	Aug. 19.	Sept. 21.	May 13, 1908.	
24	40	13	150	312	84	
9 pupae						Total, 642.

In 1908 trees were examined in the same orchard as follows:

Date.	Aug. 1.	10.	12.	15.	18.	24.	Sept. 1.	3.	8-10.	14-17.	
No. trees.		5	11	10	11	13	8	10	20	17	24
No. larvae.		12	22	25	22	28	18	20	79	43	63
Larvae per tree.		2.4	2	2.5	2	2	2 1/4	2	4	2 1/2	2 1/2

*Second Brood.* Observation in the orchard in 1906 showed the work of the second brood to be becoming noticeable about Sept. 6. In 1907, careful observations on the small trees tagged for securing the location of eggs, and on which the apples had been under constant observation, showed work of the second brood commencing Aug. 14. Sixteen pupae were connected under bands on Aug. 8 and 9, 1907, and three larvae subsequently pupated in the laboratory prior to Aug. 13. The motas emerged as follows: Aug. 12, 9; 14th, 2; 16th, 2; 17th, 1; 18th, 1; 20th, 2; 22d, 1; 23d, 1. The three which pupated in the laboratory emerged on the last three dates so that they could not have been in the pupal stage over 12, 14 and 15 days respectively. It seemed possible that the higher temperatures of midsummer might be responsible for the pupation of the first-maturing larvae. An experiment was therefore started Aug. 6, 1908, in which 120 apples, apparently containing worms, were placed in an incubator kept at about 82 degrees F. Up to Oct. 23, 33 or these larvae had died; one pupated Aug. 31, and emerged Sept. 10; one pupated Aug. 24, and emerged Sept. 2; two pupated Aug. 24 and one Sept. 8, and were still pupae, and the balance were still larvae, seventy larvae having emerged from the apples

up to Sept. 3, after which no more emerged. Thus, only 3 per cent. transformed, 7 per cent. pupated, 47 per cent. died and the balance remained larvae. Similar results have been secured in placing larvae in the greenhouse in winter, showing that the codling moth is influenced more by heredity or other unknown forces than by abnormal applications of temperature.

Attempts were made to secure eggs from the second brood of moths, but without success, nor have we been able to secure any data in regard to the place or number of eggs of the second brood in the orchard, although considerable time has been spent in search of them. That the larvae of the second brood may become full grown and pupate was shown by Dr. Headlee in 1906. On Sept. 5, 1906, he placed three larvae in the first instar in the calyces of three apples and bagged them. On Oct. 10 these were found to have merged and spun up cocoons, being apparently full grown. Five or six other apples upon which larvae were similarly placed became wormy, but the larvae escaped. Late in the season there always appear under the bands a number of half-grown larvae which form cocoons, but from none of which have we ever secured moths the next spring. Thinking that such partly grown larvae might feed in the spring, tender foliage was offered them, but without success. If it be true that the last larvae to hibernate are the last to transform to moths the next spring, as indicated in Table 3, then the individuals of the second brood of one year would give rise to those individuals which would mature latest the next season, and those larvae which mature too late to transform to a second brood, but the earliest to hibernate one year, will be the first to mature the next spring and will give rise to a partial second brood. It is evident from the band records cited above that not over 3 per cent. of the larvae maturing in a season transform to a second brood of moths, and probably not over 1 or 2 per cent.

## EXPERIMENTS IN SPRAYING FOR THE CODLING MOTH.

Experiments in spraying for the codling moth have been conducted to determine the following points:

1. The relative value of different insecticides.
2. The amount of insecticide most profitable.
3. The best time or times to spray.
4. The best method of spraying.
5. How the spray kills the larvae.

The method of treatment of each orchard is fully outlined below, but the results are discussed from the standpoint of the whole series of experiments, the detailed results of which may be found in tables 8 to 18.

Important points brought out by these experiments are (1) the absolute necessity of large plots similarly treated and the record of all fruit from a considerable number of trees in the centre of each plot, and (2) the separation of the sprayed from the unsprayed plots by a barrier plot which is given the most thorough spraying. A few years ago the writer gave a summary of the previous spraying experiments\* against the codling moth and pointed out that experiments upon but one or two trees, were of practically no value on account of the fact that the variation between two trees similarly treated will be greater than between those given different treatments. Our experiments in 1906 in the DeMeritt orchard showed that the average of five trees, similarly treated, will not give a fair basis for the determination of the efficacy of the treatment given if they adjoin untreated trees, or if in a certain portion of the orchard numerous trees bore fruit the previous year while the others had no crop, and thus gave rise to more moths in one part of the orchard than another. All of our experiments also show that to secure results which are comparable, the amount of fruit per tree must be fairly even for the whole orchard, it being impossible to secure any accurate basis of comparison between trees having large and small crops.

The experiments in the DeMeritt orchard in 1906 was a practical failure as regards giving comparable results for most of the plots owing to the arrangement of the plots, which were laid out as shown in figure 24. On either end of the sprayed plots were a few trees which had borne fruit the previous year but

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\*13th Annual Report Del. Agr. Exp. Station, pg. 184, tables VII, VIII.

had none in 1906. The Baldwin apple has a habit of bearing but every other year, and practically all of our experiments have been on this variety. As a result the trees near those which had borne the previous year, showed much more injury by the first brood than those at the centre of the sprayed plots more distant from them. See table 15, plots 11-15, 16-20, and 51-55, column 6, under First Brood, "Benefit as Total Per Cent Benefit," which show only 20 per cent., 5 per cent., and 17 per cent., respectively, against an average of 50 per cent. benefit in the other plots as regards the benefit to the first brood. Furthermore, as no barrier plot had been laid off between the unsprayed check trees and the balance of the orchard, which was unsprayed, and the sprayed portion, the moths of the second brood migrated to the sprayed trees and those plots nearest the unsprayed portion showed very little benefit to the second brood, whereas the benefit increased with the distance from the unsprayed trees. See table 15, plots 51-55, and 46-50, in column 4 under second brood.

Remembering the suggestive paper of Dr. S. A. Forbes, in which he showed the influence of the unsprayed plots upon the sprayed plots by permitting the multiplication and migration of the plum curculio, we determined that in making future experiments we would leave one end of the orchard unsprayed for checks, spray several rows across the orchard next to the checks in the best possible manner, calling this portion of the orchard the barrier plot, and would then lay off our plots at right angles to this barrier plot so that the influence of its effect upon the sprayed plots would be equal in all of them. Happily at this time the writer met Prof. A. L. Quaintance of the Bureau of Entomology, to discuss methods of work upon this subject, and it is to him that I am indebted for the suggestion that we make our plots three rows wide and count only the middle row, thus having 15 trees in each plot, the outer rows of which tend to reduce the influence of one plot on another. Our work in 1907 showed not only the absolute necessity for such an arrangement, but that it would be wise to go even further and have the plots contain 35 trees each, 5 rows wide and 7 rows long, and count the central five trees, so as to better reduce the influence of the neighboring plots. It is of the utmost importance in making an experiment to give any exact results on the codling moth, that the trees be of a uniform size, fruit evenly, and have borne approximately the same the previous year. A few trees scattered thru an orchard which have borne the previous year when the

balance of the orchard did not, will seriously affect the results of the work the following season. From careful study of our records it is evident that too much importance cannot be placed upon the ground plan of such an experiment, and that experiments based on individual trees scattered thru an orchard are of little value in trying to determine the amount or nature of the effect of spraying upon the different broods of the codling moth. Furthermore, at least five trees must be counted in each plot isolated as already described by surrounding trees similarly treated, and preferably 10 trees should be counted, for it will be found that the records of five individual trees will vary fully as much as the average of one plot and another.

In 1908 the fruit crop was so light that we were compelled to arrange our plots as best we could, and although it was entirely impossible to follow the above plan, we followed the principles as closely as possible.

The results of the three years' experiments are not as conclusive in answering the questions we had propounded for their answer, as we might wish. It is evident, however, that with the small orchards available for work, the uneven fruiting, and fruiting mostly on alternate years, that it will be impossible for us to secure any more accurate results unless the experiments were carried on for a very much longer series of years than the importance of the questions still to be answered would warrant. The main problems of practical importance and the life history of the insect for this region have been worked out. Were it not so evident that further field experiments would give equally unsatisfactory results under the orchard conditions available for such work, we should continue the experiments until some of the questions of the effect of the spray on the larvae were more definitely determined. That there is opportunity for some excellent work along this line where large orchards, evenly fruited, bearing annually, can be secured for work, is evident, and it is hoped, that the work of the writer may be suggestive of methods for the prosecution of such work.

#### EXPERIMENTS IN 1906.

##### *Orchard of H. H. Thompson, Walpole, N. H.*

This orchard is located about three miles north of Walpole, N. H., and consists of large bearing trees probably 30 years old, along the roadside and in a scattering orchard. The trees treated similarly were adjacent to each other, but there were no definite plots of trees as in 1907. A plan of the orchard would



be of no particular value in interpreting the results. All trees were sprayed twice. The first spraying was given June 2 when the calyces had barely commenced to close and were still well opened. The second spraying was given June 8 when the calyces were pretty well closed, tho many were still fairly well open. The spraying was done with an Eclipse barrel pump and Vermorel nozzels. Trees 1, 2, 3 were Baldwins sprayed with Paris green 1-4 lb. to 50 gallons of 5-5 Bordeaux mixture. Trees 4, 5, 6 were Baldwins not sprayed, used as checks. Trees G1, G2, G3 were R. I. Greenings sprayed with arsenate of lead (Eagle brand) 1 lb. per barrel of 5-5 Bordeaux mixture. Trees G4, G5, G6 were Greenings, sprayed with Paris Green, 1-4 lb. to 50 gallons 5-5 Bordeaux mixture. Trees G7 and G8 were Greenings not sprayed, used as a check.

It should be noted that the calyces were much more open in this orchard than in Prof. Hooper's orchard, which is given below. Severe russetting resulted from the spraying with the Bordeaux mixture thruout the orchard.

*Orchard of Prof. F. W. Hooper, Walpole, N. H.*

This orchard consists of about 100 trees of various varieties, a number of McIntosh Red and Baldwin trees, being about 20 years old, and with a decided southern exposure. The trees in the various groups are adjacent to each other and arranged in rows, but only the numbered trees were so treated, there being no plots as in 1907. Eclipse pump and Vermorel nozzles were used. The first spraying was given on June 2. The calyces on trees 1-8 McIntosh and Winter Pearmain were pretty well closed at this time tho the Baldwins were fairly well open. The second spraying was made June 8 when the calyces were practically closed on all but the Baldwins.

Treatment: Trees 1-4, McIntosh Red, Paris green, 1-4 lb. to the barrel of 5-5 Bordeaux mixture. Trees 5-8, Winter Pearmain, 1-4 lb. green arsenoid to 1 barrel 5-5 Bordeaux mixture. Trees 9, 11, 12, 13, Baldwin, 1-4 lb. Green Death to a barrel 5-5 Bordeaux mixture. Trees C1, C2, C3, McIntosh Red, unsprayed. Trees C4, C5, Winter Pearmain, unsprayed. C6, C7, C8, Baldwin, unsprayed.

It should be noted that on many of the trees the calyces were practically closed when the spraying was done owing to the orchard having a southern exposure and being much earlier than Mr. Thompson's. The decided difference in the results may be accounted for from this fact.



*Orchard of C. E. L. Hayward, Hancock, N. H.*

This orchard consisted of about 200 Baldwin trees about 15 years old, almost all of them bearing and in a vigorous, thrifty condition, located on a hilltop. The trees of the different groups were adjacent to each other, but only the numbered trees were sprayed as described. The sprayed trees were located in four adjacent rows forming a solid block.

The first spraying was given May 31, when the petals had just fallen, the apples being in exactly the right condition for spraying. The second spraying was given June 8 when the calyxes were closing. The spraying was done with an Eclipse barrel pump and Vermorel nozzles.

Treatment: Trees 1-5, first spraying, 1 lb. Eagle arsenate of lead, and the second spraying 1 1-2 lbs. Target arsenate of lead per bbl. Trees 6-10, first spraying, home-made arsenate of lead made with 4 ounces arsenate of soda and 11 ounces acetate of lead per barrel; second spraying, trees 6-8 sprayed in the same manner, trees 9 and 10 unsprayed. Trees 12-16, first spraying 1 lb. Target arsenate of lead per barrel; second spraying, 1 1-2 lbs. Swift's arsenate of lead per barrel. Trees 11, 17-20, first spraying, 1 lb. Swift's arsenate of lead per barrel; second spraying, 1 1-2 lbs. Eagle arsenate of lead per barrel. Tree 21, first spraying, Swift's arsenate of lead 1 lb. to the barrel; trees 22-25, first spraying, 1 1-2 lbs. Disparene per barrel; trees 21-25, second spraying, 1 1-2 lbs. Disparene per barrel. The arsenate of lead was added to 5-5 Bordeaux mixture in all cases.

The object of the experiment was to give a field comparison of different brands of arsenate of lead, but owing to the confusion in putting the brands on the same plots at the time of the second spraying, this was prevented in all but trees 6-8 sprayed with home-made arsenate of lead, as contrasted with trees 22-25, sprayed with Disparene. About 3 gallons of mixture was used per tree. Subsequent experiments show that it is decidedly doubtful whether a field test of arsenates of lead of approximately uniform grade, will show any decided difference in the result and no further experiments have been made along this line as it has seemed to the writer impracticable to secure accurate comparisons in the field which could be certainly attributed to the difference in the various brands. Great benefit would have been secured in this orchard if more mixture had been used. Subsequent experience shows that 5 gallons should probably have been used where but 3 were used.

*Orchard of William Weeks, Greenland, N. H.*

This orchard consisted of two or three hundred Baldwin trees, 40 or 50 years old, near Bayside station. The trees bearing fruit were scattered thru the orchard and were practically all used in the experiments. Trees in the various groups were adjacent to each other but no large plots were treated as in 1907. Six groups of 4 trees each were sprayed as follows: Trees 1-4 1 lb. arsenate of lead per barrel 5-5 Bordeaux mixture. Trees 5-8, Bowker's Dust Bordeaux (copper phosphate), 15 lbs. per barrel (1 1-2 lbs. lime added to counteract free copper by ferrocyanide test). Trees 9-12, Pyrox, 8 lbs. per barrel. Trees 13-16, Target Quick Bordeaux 10 lbs. per barrel and 1 lb. arsenate of lead. Trees 17-20, 1 lb. arsenate of lead to 10 lbs. Leggett's Dry Bordeaux. Trees 21-24, 1-4 lb. arsenate of lead to 1 gallon Lennox Concentrated Bordeaux mixture per barrel. The arsenate of lead was Swift's made by the Merrimac Chemical Co. The object of the spraying was to secure data as to the comparative effect of Pyrox with arsenate of lead, and various prepared Bordeaux mixtures with the home-made Bordeaux, upon apple scab, but so little scab developed that no results of positive value were secured. Unfortunately, the records of the picked fruit were lost in the case of all but 4 trees, which are given in Table 19, but inasmuch as all were treated with the same amount and kind of arsenate of lead they form a fair basis for comparison with the unsprayed trees.

The first spraying was given May 30 when almost all the petals had dropped from the trees. The second spraying was given June 11 when the calyces were partially open but were nearly closed.

The results of this orchard are particularly interesting in showing the benefit derived from spraying in a badly infested orchard.

The record of the picked fruit from a commercial standpoint, is of interest in this orchard, as care was taken to secure the amount of fruit from sprayed and unsprayed trees when it was graded and packed. The sprayed trees picked 3.2 barrels per tree, of which .75 barrels was No. 1 fruit and 2.45 barrels No. 2 fruit. The unsprayed picked 1.8 barrels per tree, of which .4 barrel was No. 1 fruit and 1.4 barrel was No. 2 fruit, the grades one and two being used in the exact sense as defined by the National Apple Dealers Association. These figures would show that the spraying gave a benefit of 1.4 barrel picked fruit per tree, or 44 per cent., of which .35 barrels per tree was No. 1

fruit, giving a benefit of 46 per cent. for No. 1's; and 1.05 barrels was No. 2 fruit, giving a benefit of 41 per cent. for No. 2 fruit. The actual price paid for this fruit in the orchard was \$1.00 per barrel on the tree, so that the actual benefit from the spraying, as shown by the difference in the amount of picked fruit between the sprayed and unsprayed trees, was worth \$1.40 per tree.

*Orchard of Albert DeMeritt, Durham, N. H.*

This orchard consists of about 150 Baldwin trees about 35 years old, and located as shown in figure 25. The trees sprayed were adjacent to each other as shown in figure 25, but no surrounding trees were similarly treated so as to form plots, as in 1907. The first spraying was given May 30 when the blossoms had just dropped, there being still about 25 per cent. of the petals on the trees. The second spraying was given June 8 and 9, when the calyces had barely closed. A third spraying was given June 21. The fifth spraying was given Aug. 30. The trees were sprayed with an Eclipse pump and Mistry nozzles. The first spraying was given during a strong breeze; the trees are high and undoubtedly many parts were not thoroughly covered. About 2 1-2 gallons of mixture were used per tree, which is entirely too small an amount, as subsequent experience has shown. Eagle brand arsenate of lead was used in this experiment, analysis of which shows, page 435, a very low content of arsenic.

*Treatment.* Trees 11-15, arsenate of lead 1 lb. to 50 gallons of 5-5 Bordeaux; first spraying only. Trees 16-20, 1 lb. arsenate of lead per barrel 5-5 Bordeaux mixture first spraying and 1 lb. arsenate of lead per barrel of water, 5th spraying. Trees 21-25 given first and third sprayings with K. L. B. P., made with Bordeaux and Paris Green. This was made to contain 15 per cent. kerosene and 1-3 lb. Paris Green per barrel of 5-5 Bordeaux. Trees 26-30 given sprays 1 and 2 with K. L. B. P., made the same as for trees 21-25. The actual ingredients used being 5 lbs. lime 1 1-4 gallons kerosene, 11 gallons 5-5 Bordeaux mixture, 1 1-3 ounces Paris green. Trees 31-35 given first and second sprayings with Paris green 1-3 lb. per barrel of 5-5 Bordeaux. Trees 36-40 given first and second sprays with 2-5 lb. Paris green per barrel of 5-5 Bordeaux mixture. Trees 41-45 given first and second sprayings, 2 lbs. of arsenate of lead per barrel of 5-5 Bordeaux mixture. Trees 46-50 given first and third sprayings with arsenate of lead 1 lb. per barrel of 5-5 Bordeaux mixture. Trees 51-55 given first two sprayings, 1 lb. arsenate of lead per barrel 5-5 Bordeaux mixture. Trees 56-60 given third

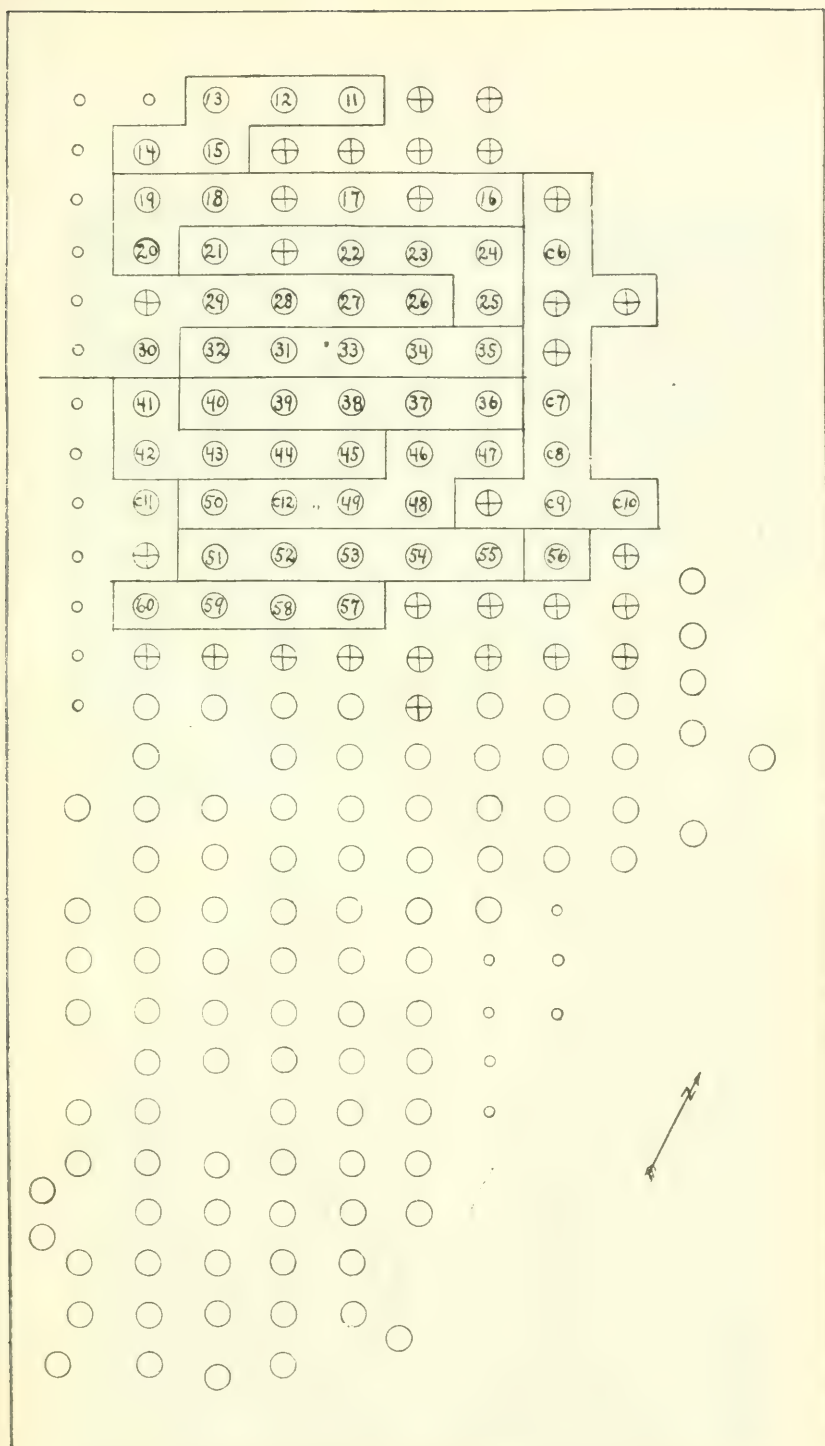


FIG. 25.—Diagram of orchard of Albert DeMeritt, Durham, N. H., used in experiments in 1906. Circles represent trees. Circles with crosses are trees which bore in 1905, but bore practically no crop in 1906. Solid lines show boundaries of sprayed plots; remainder of orchard unsprayed.

spraying only, arsenate of lead 1 lb. to 50 gallons 5-5 Bordeaux mixture. At the third spraying, trees 46, 47, 56 and 58 were specially sprayed on the under surface of the foliage, but no difference could be found between these trees and the others upon comparing the results for the season.

Considerable russetting of the fruit resulted in this orchard. Those given the first spraying only were russetted nearly as badly as those sprayed twice. Those sprayed with the K. L. B. P. were not russetted as badly as those sprayed with plain Bordeaux. Trees given the first and third sprayings were not as badly injured as those given the first and second spraying. Trees given the third spraying only, were but slightly russetted.

The results of the spraying in this orchard are discussed below. It should be pointed out that the southern half of the orchard was entirely unsprayed, and it is very evident that the sprayed trees adjoining the unsprayed portion were more seriously injured by the second brood.

It should also be noted that in this orchard the trees bearing in 1906 probably did not bear any considerable crop in 1905, whereas the trees that bore in 1905 bore nothing in 1906. The sprayed trees next to those trees which bore in 1905, as indicated in figure 25, seem to show less benefit from this spraying, and probably were more infested.

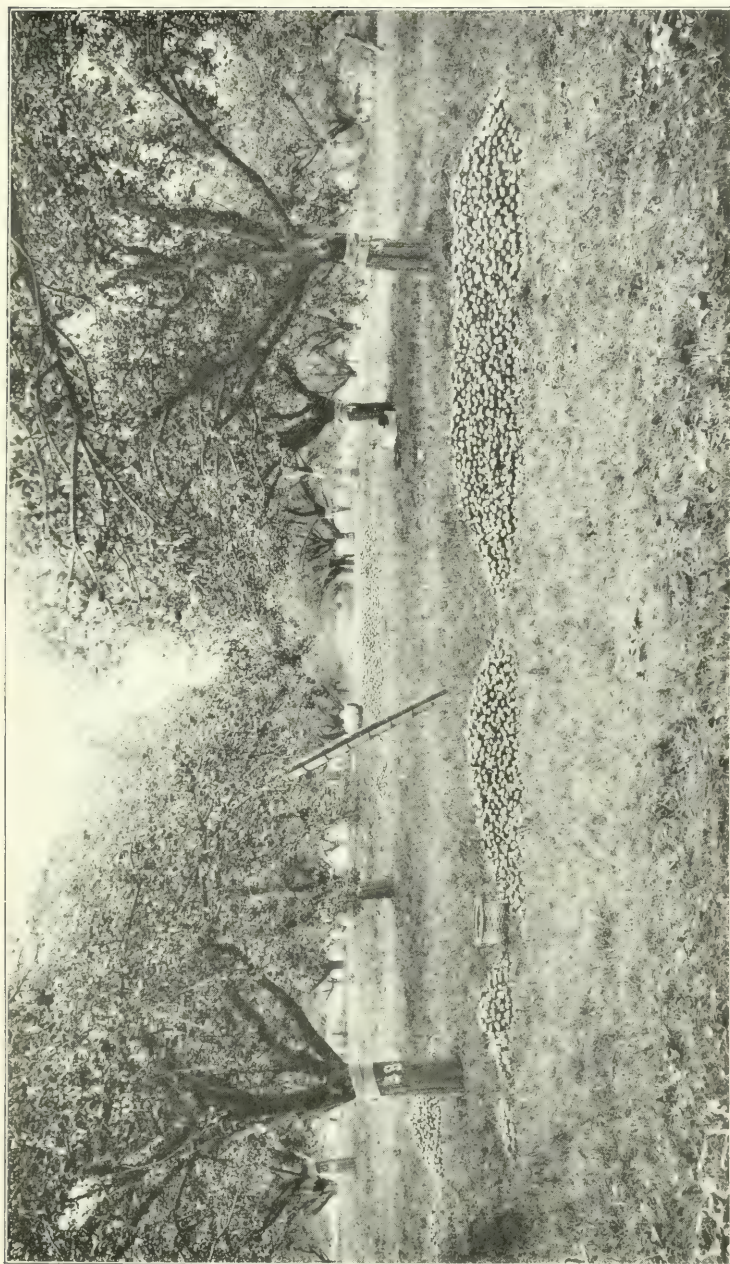
The results in this orchard point very closely to the desirability of arranging such experiments in plots as were used in our experiments in 1907.

#### EXPERIMENTS IN 1907.

##### *Orchard of Gilman Woodman, Durham, N. H.*

This orchard consists of Baldwin trees about 30 years old, located as shown in fig. 26. Some old scattering trees run along the walls of the farm, but otherwise there are no orchards within a half mile. To obviate the influence of one plot on another and of the check trees on the treated trees, the orchard was laid out in plots as shown in fig. 26, with the idea of counting only the five trees of the middle row of each plot. In plots 1 and 2 the outer row was counted. Plot 4 was treated in different ways, all of the trees being counted. The rows of barrier trees, thoroughly sprayed, prevent any influence from the check plot upon the treated plot, as the results seem to show. The dates of the spraying were as follows: First spraying, June 13, 14, when the majority of the blossoms had dropped; second spraying, June 25; third spraying, July 3 and





View in DeMeritt Orchard, Durham, N. H., 1906.





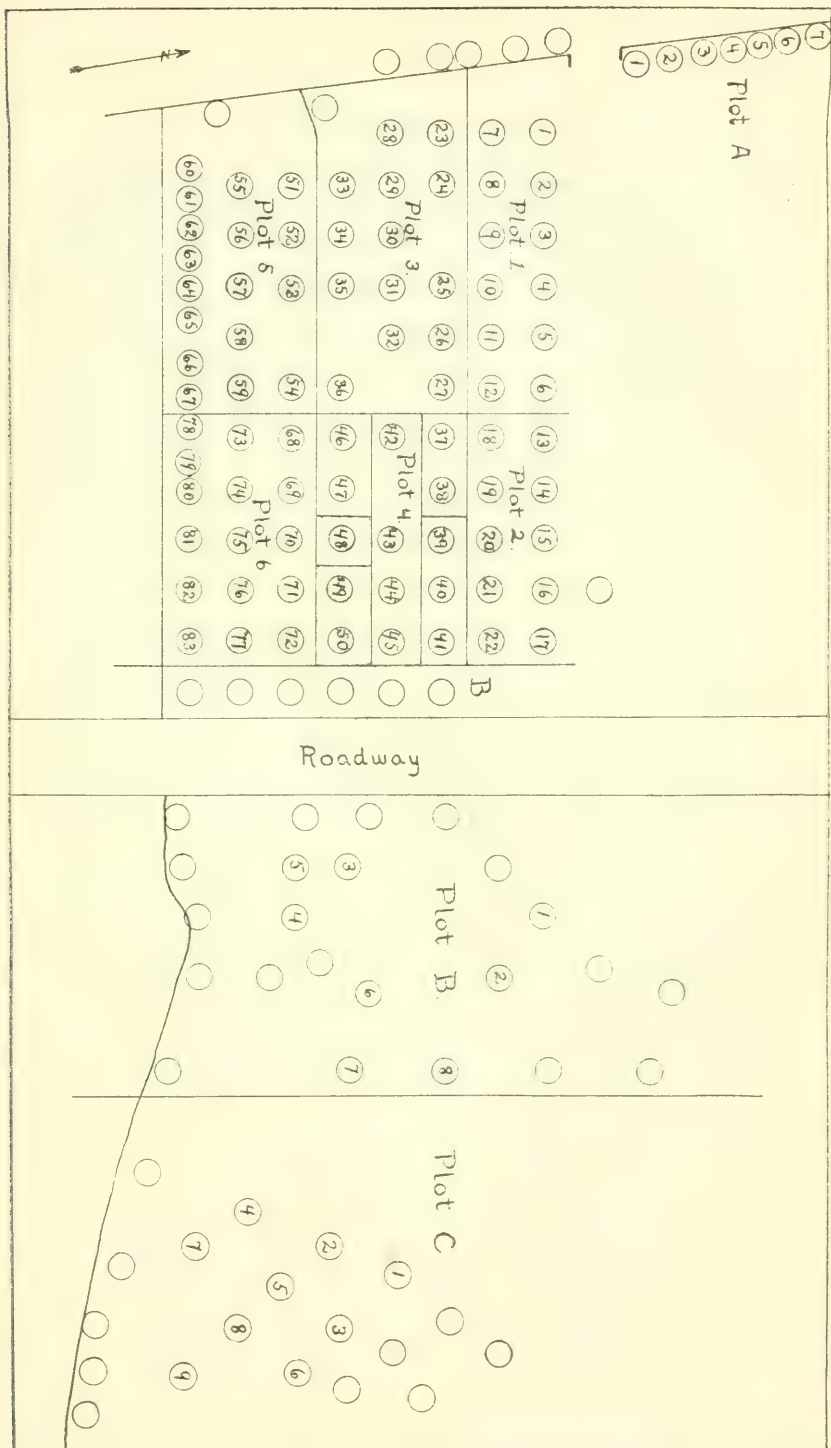


FIG. 26.—Orchard of Gilman Woodman, Durham, N. H., 1907.

4 and July 8. The spraying was done with an Eclipse barrel pump and Mistry nozzles with a pressure of not less than 80 lbs. as shown by pressure guage. Swift's arsenate of lead, 2 lbs. per barrel, was used on all plots, the use of Bordeaux mixture being discarded to obviate the danger of russetting the fruit.

The treatment of the various plots was as follows: Plot 1, given first spraying with Mistry nozzles, third spraying in the usual manner. Plot 2, given spray 1 applied with Bordeaux nozzles giving a coarse spray at as high a pressure as could be secured with the pump, and the spraying was kept up until the mixture ran from the trees. Plot 3, given sprays 1 and 3, using the Mistry nozzles. Plot 4A, trees 39, 40, 41 were given the third spraying in the usual way. About 7 gallons of spray was applied to each tree. Plot 4A, trees 37 and 38, were given the third spraying with the addition of 3 lbs. of Good's resin fish-oil soap to the 2 lbs. of arsenate of lead, per barrel. Plot 4B, given the first spraying applied to the calyces with a nasal atomizer so that the foliage was not sprayed. Plot 4C, trees 46 and 47, given third spraying, the foliage being sprayed from both above and from below by men on the ground. Plot 4C, tree 48, was given a third spraying from above and below, but before spraying all of the apples were covered with small paper bags, which were removed immediately after the spraying, so that the foliage was sprayed but the apples were untouched. Plot 4C, trees 49 and 50, were not bearing and were left untreated. Plot A, consisting of a row of trees along a wall separate from the orchard, was given sprays 1, 3 and 5, the latter being applied about the middle of August, when it was thought the eggs of the second brood would have been deposited. Plot B, was given the first, second and third sprayings, the bearing trees being sprayed with Bordeaux nozzles until they dripped freely, the same as plot 2. Plot 5 was given the second spraying only. Fine cap Vermorel nozzles were used. Plot 6 was given spray 3 only with small aperture triple Vermorel nozzles.

*Orchard of W. A. Deering, Pittsfield, N. H.*

This is a young orchard of about 275 trees about 17 or 18 years old. The four outside rows on each side were top worked to McIntosh Red. Plots 13, 14, 15 were mostly Ben Davis, while plots 8 to 12 were trees which were partially Baldwin and partly McIntosh Red. The trees were small and there were numerous trees missing. The orchard bordered a

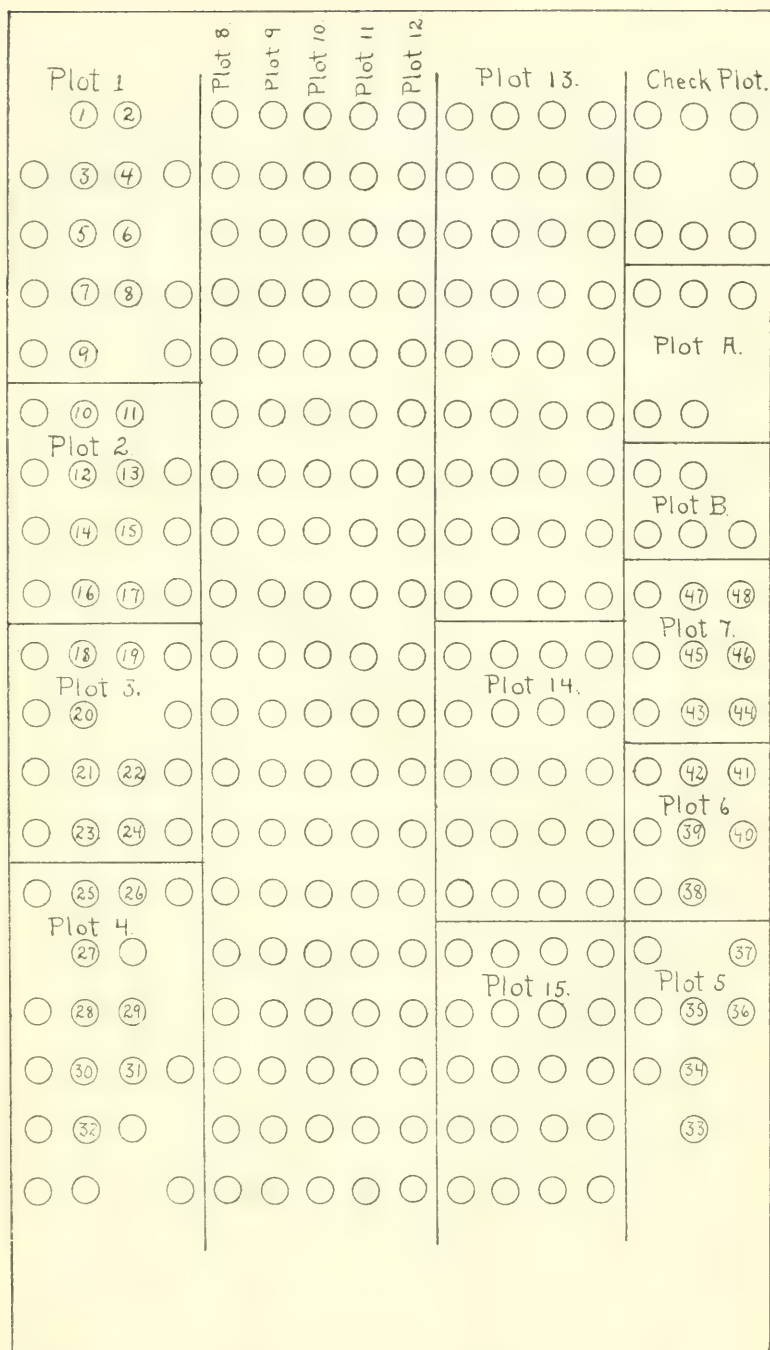


FIG. 27. Diagram of the orchard of W. A. Deering, Pittsfield, N. H., 1907.

road on the south, beyond which was an old orchard which would form a natural source of infection.

The dates of spraying for the codling moth were as follows: The first spraying June 17 and 18, when the blossoms had practically all fallen and on some of the McIntosh trees the calyces were about one-half closed. The second spraying was made June 29. The third spraying was given July 11 and the 5th spraying August 16. A spraying with fungicides was given on May 20.

The plan of the plots is shown in Fig. 27, all trees in each plot being treated in the same way, but only the central trees being recorded. The spraying was done with an Eclipse pump, and Mistry or Spramotor nozzles, except where otherwise noted. 2 lbs. Swift's arsenate of lead per barrel was used on all plots not otherwise specified.

*Treatment.* Plot 1 was given the first and second sprayings with the arsenate of lead added to 3-4 Bordeaux mixture and applied with Mistry nozzles. Plot 2 was given the first and second sprayings with arsenate of lead added to 3-4 Bordeaux mixture, applied with Bordeaux nozzles, with 90 to 100 lbs. pressure, until the trees dripped freely. Plot 3 was given the first, second and third sprayings with the arsenate of lead added to 3-4 Bordeaux mixture, the first two sprayings applied with Mistry nozzles. Plot 4, given the first, second and third sprayings with 1-3 lb. Paris green per barrel of 2-4 Bordeaux mixture. Plot 5 was given the first, second and third spraying, the first two being the same as plot 4, but the third spraying consisting of kerosene-limoid mixture, containing 15 per cent. kerosene and 1-3 pound Paris green per barrel. Plots 6 and 7 were given the first and second sprayings with 1-3 lb. Paris green and 10 lbs. of copper phosphate per barrel, with enough fresh lime added to neutralize the free copper as shown by ferro-cyanide test on plot 7. Plots 8, 9, 10 and 11 were given the first and second sprayings with arsenate of lead added to Bordeaux mixture, made with sodium benzoate in various ways. Plot 12 was given the first and second sprays with arsenate of lead added to 3-4 Bordeaux mixture. Plot 13 and the north row of plots 14 and 15, were given the first, second and third sprays with arsenate of lead without any Bordeaux. Plot 14, except the north row, was given the fifth spray only, with 2 lbs. arsenate of lead per barrel. Plot 15 except the north row, was given the fifth spray only with 2 lbs. arsenate of lead per barrel to which was added 3 lbs. of Good's resin fish oil soap.

Plot B, barrier plot, was given the same treatment as plot 3, namely, the first and second sprayings with arsenate of lead added to 3-4 Bordeaux mixture. Plot A was given the first and second sprayings with Bordeaux mixture, only, without arsenate of lead. Plot C was given no treatment and formed a check plot. Considerable russetting of the fruit resulted from the Bordeaux mixture throughout the orchard. Russetting resulted, even from the 2-4 Bordeaux mixture, and both on plots given only the first and only the third sprayings.

*Orchard of Arthur Ladd, Deerfield, N. H.*

The treated plots consisted of about 60 trees, forming the east end of an orchard about three times this size, situated on the crest of a high ridge. The balance of the orchard was mostly Mann apples. The trees treated were McIntosh Red, about 20 years old. The plan of the orchard treated is shown in Fig. 28. The trees were sprayed with a Myers pump and Mistry nozzles. The dates of spraying were as follows:

First spraying June 7, second spraying June 21. A previous spraying had been given with fungicides on May 17.

Plots A, B, C and D consisted of three rows of trees, all trees in each plot being given the same insecticidal treatment, but each of the three rows being sprayed with a different fungicide. 2 lbs. of arsenate of lead per barrel were in all cases added to the fungicide. All plots were given the first and second sprayings.

Plot A, row 2, was given the first spraying with Target brand arsenate of lead, and the second spraying with Swift's arsenate of lead added to Target Quick Bordeaux mixture, 10 lbs. per barrel. Plot B, row 5, was sprayed with Eagle arsenate of lead, 2 lbs. per barrel, added to Leggett's Dry Bordeaux mixture oxidized, 10 lbs. per barrel. Plot C, row 8, was sprayed with Target arsenate of lead, 2 lbs., added to Lion Bordeaux, 3 quarts per barrel. Plot D, row 10 sprayed with Target arsenate of lead, 2 lbs., added to copper phosphate, 15 lbs. per barrel. Plot E was sprayed with Pyrox, 5 lbs. per barrel. Plot F was sprayed with arsenate of lead, 2 lbs. and 2-4 home-made Bordeaux mixture. Plot C was unsprayed and formed the check.

The work in this orchard and in that of J. T. Smith, was carried on under the supervision of Dr. Charles Brooks, the Botanist of the Station, throughout the season.



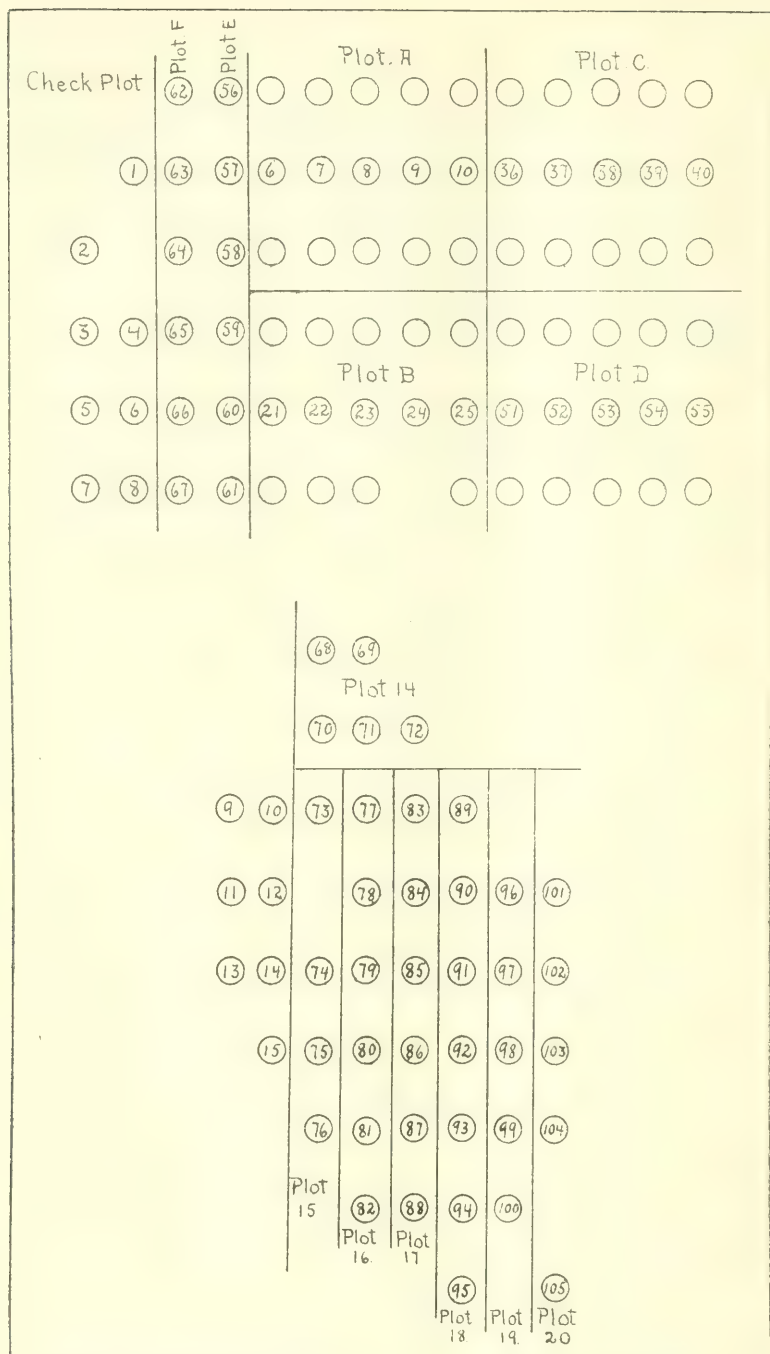


FIG. 28. Above: diagram of the orchard of Arthur Ladd, Deerfield, N. H.,  
Below: orchard of J. T. Smith.

*Orchard of Jonathan T. Smith, Deerfield, N. H.*

This orchard consisted of McIntosh Red trees about 20 years old, arranged as shown in Fig. 28, immediately next to the owner's house. A small scattering orchard stood back of the barn across the road. The orchard sprayed was at the foot of a slope. Trees were sprayed with the same apparatus as used in Mr. Ladd's orchard and on the same dates.

*Treatment.* Plot 14 was given the first and second sprayings with 2 lbs. Disparene added to 4-4 Bordeaux mixture. Plots 15, 16, 17 and 18 were given the first spraying with 2 lbs. Disparene per barrel added to various strengths of Bordeaux mixture and the benzoate of soda Bordeaux, but the second spraying was made with fungicide only. Plots 19 and 20 were sprayed with fungicide only. The insecticide applications on the plots in the orchards of Mr. Smith and Mr. Ladd, were planned to show the relative value of different brands of arsenate of lead, but owing to misunderstanding they were not all applied as originally intended, though they furnish a basis for comparison of three brands and are of interest in showing the value of the first and second spray, as compared with the same in other orchards.

## EXPERIMENTS IN 1908.

*Orchard of Gilman Woodman, Durham, N. H.*

The same orchard as used in the experiments in 1907 was arranged in plots as shown in Fig. 29, which were necessitated by the very few trees bearing, practically all of the bearing trees being utilized in the experiment. The spraying was done with a Niagara gas sprayer and Vermorel nozzles, unless otherwise specified, a pressure of 90 to 100 lbs. being usually maintained. The dates of spraying were as follows: First spraying, May 27-28; third spraying, June 22. The first spraying was given just after the blossoms had dropped.

*Treatment.* 2 lbs. Grasselli's arsenate of lead, per barrel, was used in all cases, without the Bordeaux mixture. Plot 1 was given the first spraying only, with 4 Vermorel nozzles, with fine apertures, so as to make a mist at 100 lbs. pressure, the trees being thoroughly sprayed. Plot 2 was sprayed with nasal atomizers from May 30 to June 6, the spray being directed into the calyces without placing any on the foliage. Tree 8 was gone over twice in this way. Plot 3 was given the first spraying only, but a

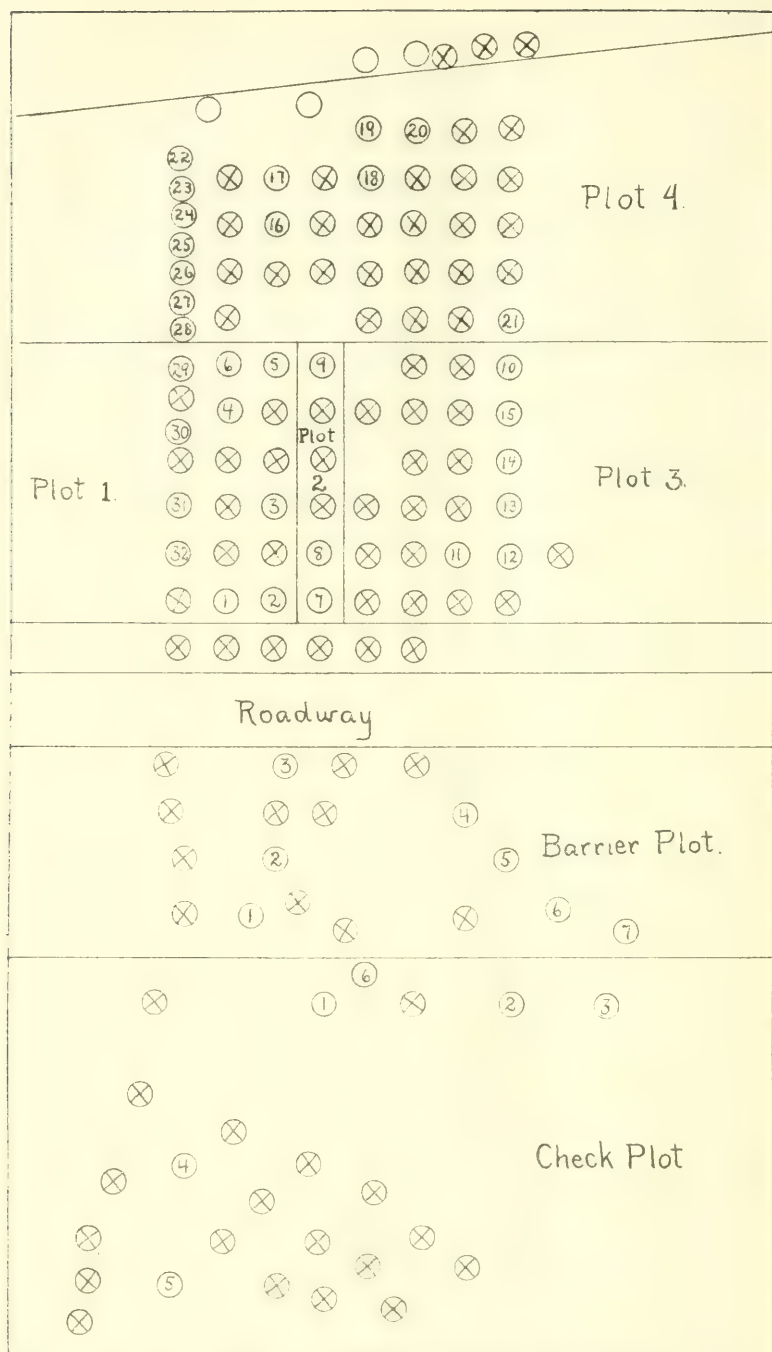


FIG 29. Diagram of the orchard of Gilman Woodman, Durham, N. H.

double Bordeaux nozzle with coarse spray was used, directed into the calyces and at a pressure of 110 to 120 lbs. The foliage was thoroughly drenched with 7 to 10 gallons per tree. Plot 4 was given the third spraying only. Plot B, barrier plot, was given the first and third sprayings. Plot C was unsprayed and formed the check.

*Orchard of Albert DeMeritt, Durham, N. H.*

The same orchard as used in the experiments of 1906 was arranged in plots, as shown in Fig. 30, the arrangement being necessitated by the very few trees bearing fruit. The southern part of the orchard remained unsprayed. Trees were sprayed with a gas sprayer and Vermorel nozzels, the first spraying being given May 28 and 30; the second spraying June 11 and the third spraying June 23.

Plot 1 was given the first and third sprayings, 2 lbs. Grasselli's arsenate of lead per barrel. Plot 2 was given the second spraying only, 2 lbs. Grasselli's arsenate of lead per barrel. The calyces were closed about June 6. Plot 3 was given the third spraying only, with 2 lbs. Grasselli's arsenate of lead. Plot B, barrier plot, was given the same treatment as plot 1. Plot C was unsprayed and formed the check plot.

*Packers Falls Orchard, Durham, N. H.*

This orchard is one leased by the Station from Mrs. S. J. Woodman for a term of years for experiments of the Horticultural Department, and consists of about 300 trees arranged as shown in Fig. 31. Another orchard lies to the west of this orchard at a distance of some 75 yards beyond Plot C. Trees were sprayed with a Niagara gas sprayer and Vermorel nozzles, except plot 1, where Bordeaux nozzles were used. Grasselli's arsenate of lead was used throughout.

The first spraying was given June 4 to 6; the third spraying June 26; the fifth spraying August 11. At the time of the first spraying the calyces were as nearly closed as would be possible and still permit effective spraying. This may partially account for the advantage shown by a drenching spray.

Plot 1 was given the first spraying only with 2 lbs. arsenate of lead, using Bordeaux nozzles with a drenching spray directed into the calyces with 110 to 120 lbs. pressure. Plot 2 was given the first spraying only, but with 4 Vermorel nozzles at about 100 lbs. pressure. Plot 3 was given the first spraying with 2 lbs. arsenate of lead and the third spraying with 10 lbs. per bar-

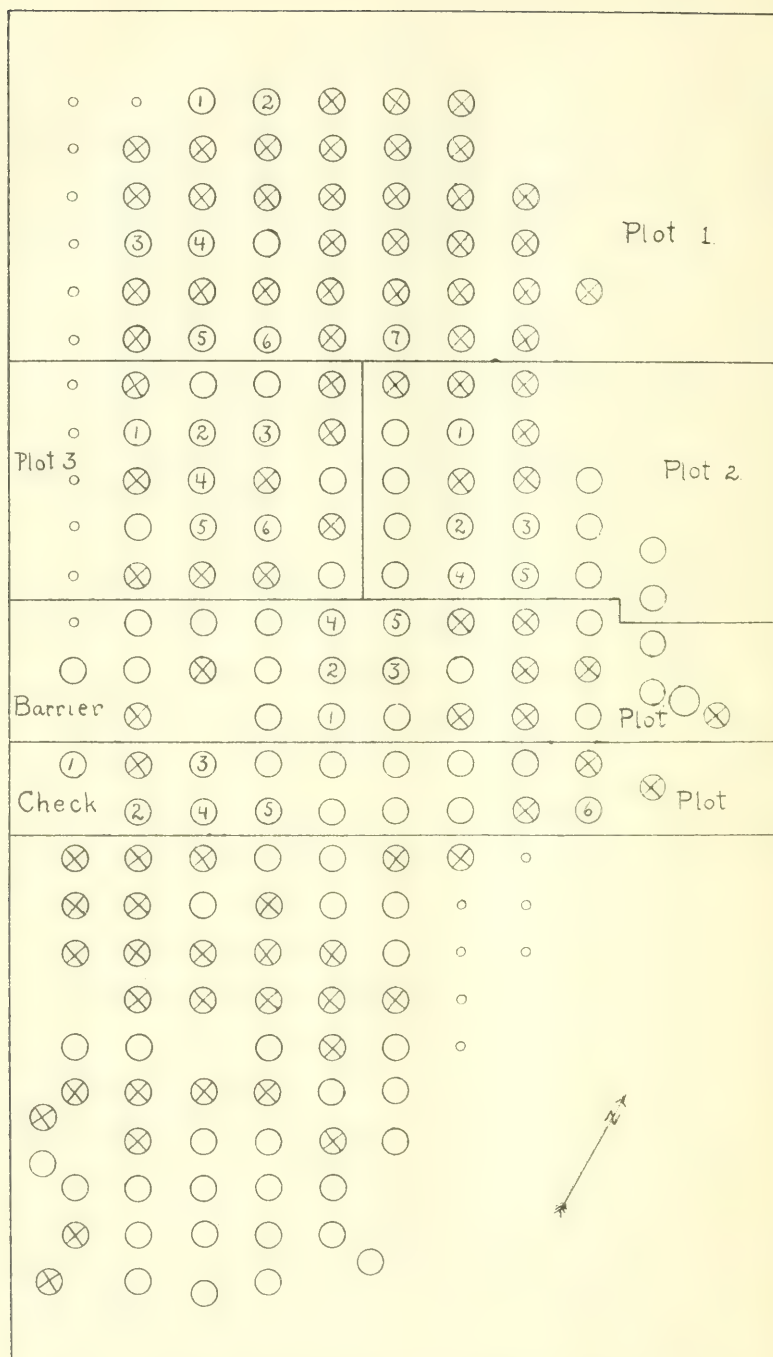


FIG. 30. Diagram of the orchard of Albert DeMeritt, Durham, N. H., 1908.

rel. Plot 4 was given the first, third, and fifth sprays with 2 lbs. arsenate of lead per barrel. It should be noted that the bearing trees in this orchard are quite scattering and that there were very few apples, which may account for the very peculiar results secured.

*Orchard of W. A. Deering, Pittsfield, N. H.*

This is the same orchard used in the experiments in 1907, but was arranged in plots as shown in Fig. 32. The first spraying was given May 30 and the third spraying June 24. At the time of the first spraying the blossoms had just fallen. An Eclipse barrel pump and quadruple Sramotor nozzles were used. Swift's arsenate of lead was used on all plots, 2 lbs. per barrel in every case.

Plot 1 was given the first spraying only, with about 75 lbs. pressure. Plot 1, row C, was sprayed with a nasal atomizer. Plot 2 was given spray 1 only, but with double Bordeaux nozzles, at 90 lbs. pressure, with the spray directed into the calyces and the trees thoroughly drenched. Plot 3 was given the third spraying only. Plot 3, trees 1-5 had the apples covered with paper bags before the spraying, which were removed immediately afterward in order to show the value of the spray placed on the surface of the apples. Plot 4 was given sprays 1 and 3. Plot B, barrier plot, was treated like Plot 4. Plot C formed the check plot and was unsprayed. The drops of about two weeks in September were not secured owing to the inroads of cattle, but the proportion of these to the total number of drops is so small as not to materially invalidate the records.

*Analyses of Insecticides Used.*

Through the courtesy of the Chemical Department many of the insecticides and fungicides used in the experiments were analyzed, with the following results:

INSECTICIDES.

Green Death.  $\text{As}_2\text{O}_3$ -49.5 per cent.  $\text{CaO}$ -32.1 per cent.  $\text{Cr}_2\text{O}_3$ -1 per cent.  
 $\text{CaCO}_3$ -35.2 per cent. Probably arsenite of lime. Very soluble.

Arsenates of Lead or Compounds.		Water. Per cent.	Lead Oxid. Per cent.	Arsenic Oxid. Per cent.	
Eagle Brand	1906.		37.4	8.5	
	1907.	39.	38.9	15.8	
Swift's	1906.		40.	14.	
	1907.	44.8	36.5	16.6	
Target Brand	1906.		39.5	13.9	
	1906.		40.2	12.5	
Diaparene	1907.	45.4	33.9	13.6	
	1907.	38.	43.2	14.1	
Star					
Pyrox			21.5		CuO
Acetate of Lead			60.3	7.5	1.4 Per
Arsenate of Soda				48.	cent.



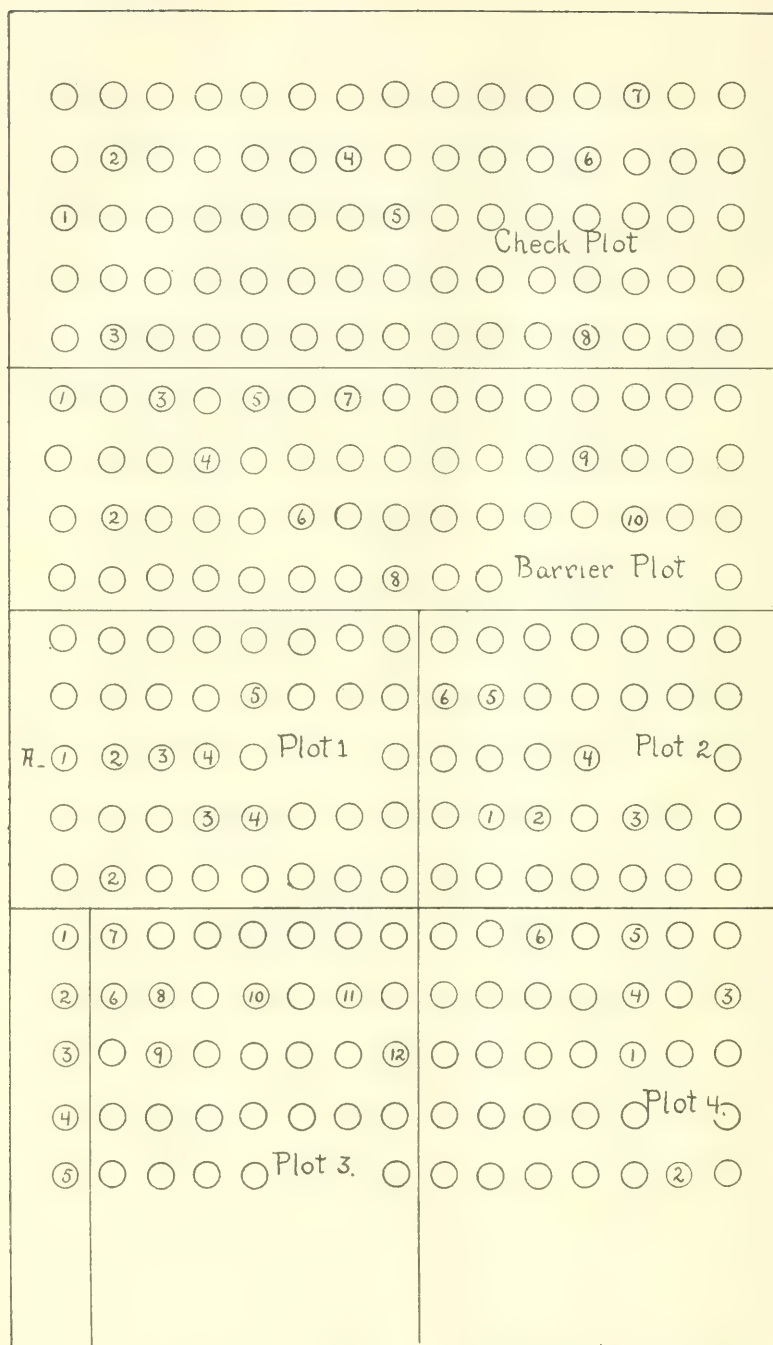


FIG. 32. Diagram of the orchard of W. A. Deering, Pittsfield, N. H., 1908

1906	FUNGICIDES.				
	CuO.	As <sub>2</sub> O <sub>3</sub>	CaO.	P <sub>2</sub> O <sub>5</sub>	Water
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Lenox Bordeaux Mixture (paste)	1.26	3.00	28.5		67
Bug and Blight Dust. No. 3	9.21	7.1	41.4		
Leggett's Dry Bordeaux	16.6		34.		
	(as cupric oxid)				
Copper Phosphate	20.3	2.5	17.5	16.2	

## METHODS OF RECORDING AND TABULATING RESULTS.

The windfalls were gathered frequently during the season as often as necessary to secure them all, and commencing as soon as the fruit was the size of a good-sized marble. All the windfalls were carefully examined to determine whether the larva had entered the calyx or side of the fruit, most of the smaller fruits being sliced to make certain. In 1906 and 1907 all windfalls up to the date of the appearance of the second brood were counted as the work of the first brood, and the work of the second brood was then recorded separately for the remaining windfalls and picked fruit, the determination of the brood being based upon the character of the work and the size of the larva. This permitted some error, but it is believed that the possible per cent. of error was very slight. However, to distinguish certainly between the work of the first and second broods, in 1908 at the time when the second brood should be ovipositing and eggs hatching the trees were gone over by hand and all of the fruit injured by the first brood was picked off and recorded. This prevented a complete record of the "dropped" fruit, as most of these wormy fruits would have dropped later. After the records for the season were secured, the dropped and picked fruit for each tree was determined and the trees of each plot arranged in tables as given in Tables 8 to 14, which show the variability of the various trees in each plot and the average for the plot. At first the average of the percentages of the trees in a plot was taken as the average per cent., but it was soon found that this was inaccurate, as sufficient weight was not given the variable number of apples on the different trees, which cause widely fluctuating percentages, so the total number of apples for the plot was divided into the total number of apples under the various headings, and percentages thus secured which truly represent the average of the whole plot. A brief study of the variation of trees in any and all of these plots will show the utter uselessness of basing conclusions regarding spraying experiments against the codling moth upon one or two or even three trees. Five trees is a minimum number for such work and the average of ten would be much more satisfactory. In all

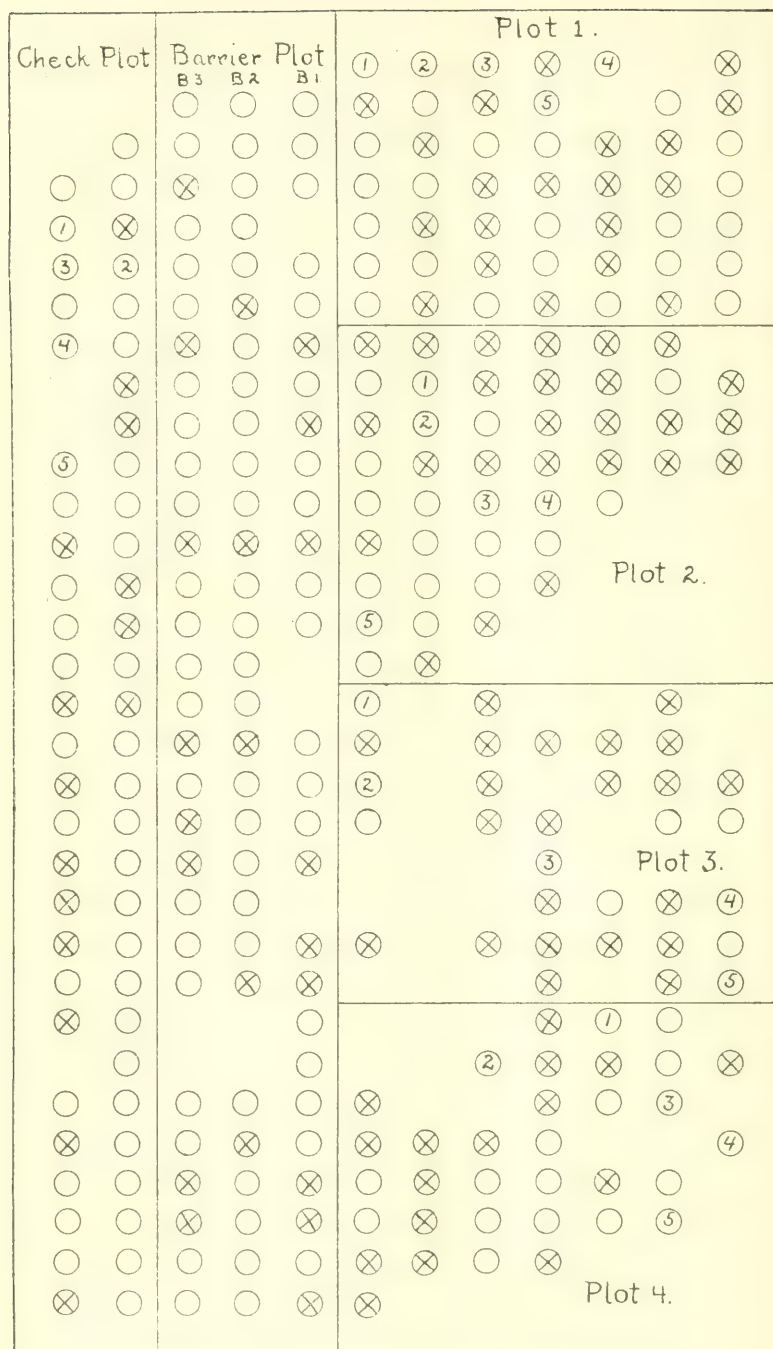


FIG. 31. Diagram of the Packers' Falls orchard, Durham, N. H., 1908.

of the records apples entered at the stem are counted as "side" wormy.

In an endeavor to determine how the various sprayings affect the larvae and where the larvae are killed by them, the data from all the plots was assembled in Tables 15, 16, 17. These tables separate the apples wormy by the first and second broods, and analyze both the work of each of the broods and the total for both broods, as regards the number injured by larvae entering the calyx and entering the side. A brief explanation of the various columns, their significance and how obtained, will be necessary. Column 1—"per cent. of total fruit," gives the percentage of the total fruit borne by the tree, which was injured by the first brood. Column 2 "per cent. of benefit," expresses this in terms of "benefit." In all cases in these tables the "benefit" is secured by subtracting the percentage in the previous column from that of the "check" plot and dividing the remainder by the percentage of the check, thus giving the amount gained, or benefit, in the plot under consideration over the untreated plot in terms of per cent., assuming that if the plot under consideration had 0 per cent. of the total fruit injured by the first brood that there would have been 100 per cent. benefit over the check. It is believed that such a method of expressing the "benefit," gives the most accurate measure of the effectiveness of the various sprays as regards any given point. Column 3 "per cent. of total wormy" gives the per cent. of the total number of wormy apples for the season which were injured by the first brood. In each case where the term "per cent. of total wormy" appears, it refers in like manner to the per cent. of the total wormy for the whole season which the apples wormy through the calyx or side of the first or second broods respectively form. Column 4, "benefit as 'total per cent. benefit'" gives the benefit shown in column 2 in terms of the "per cent. benefit" for the whole season. Thus, if the 'total per cent. benefit, for the whole season of Plot B in G. Woodman's orchard in 1908 (table 17) was 85 per cent., 62 per cent. of this was due to the spraying decreasing injury by the first brood and only 23 per cent. by decreasing injury by the second brood. In each column in which the term "benefit as 'total per cent. benefit'" appears, it refers in like manner to that part of the total benefit of the season secured in preventing injury by the First Brood, Total Calyx, or Side, or Second Brood, Total Calyx, or Side. Column 4 is secured by multiplying column 2 by column 3 of the check plot. Thus, column 4 gives the true index of

the value of the spray used on a given plot in comparison with the check and by dividing column 4 by the total benefit for the whole season, as given in the last column of the table, the part of the benefit due to the effect on the first brood can be secured in terms of percentage. Column 5 "per cent. of first Brood," gives the percentage of the apples injured by the first brood, which were entered at the calyx, and the next column the same in "per cent. benefit." The remaining columns under "Calyx" and "Side" are similar to those already explained. Under "Second Brood," the first four columns under "Total" are similar to the first four columns in the table under "First Brood." It is evident, however, that the apparent effect of any given treatment on the second brood cannot be due to its direct effect in killing the second brood of larvae, for in such plots the first brood of larvae have been killed out and there will be but few moths of the second brood to mature, and if none of the larvae of the second brood were killed we should find them decidedly fewer in the treated than in the check plots, owing to the effect of the spraying on the first brood. This will be particularly true where the plots are large and uniform and the second brood is small. If the "per cent. benefit" in "per cent. of total fruit" injured by the second brood is greater than the similar "per cent. benefit" in "per cent. of total fruit" injured by the first brood, then it is evident that the spray has given more benefit to the second brood than to the first brood, and the difference between them should give the direct effect on the second brood. Thus, by subtracting column 2 under First Brood from column 2 under Second Brood, we secure column 5 under Second Brood or "per cent. benefit, direct effect," and in the same manner are secured the direct effect upon the second brood *Calyx* and *Side* in contrast to the first brood. This may be seen in Table 15, line 2, where 16 per cent. is the direct effect on trees 11-15 in terms of the "per cent. benefit of per cent. of total fruit." In this particular case the first brood showed a benefit in column 2 of 20 per cent. If the second brood had showed a benefit in column 2 of only 20 per cent., no direct effect on the second brood could be attributed to the spray. Any per cent. of benefit above 20 per cent., in this case 16 per cent., will therefore be due to the direct action of the treatment on the second brood. It is evident that if the treatment were entirely successful there would have been in this case 80 per cent. direct effect benefit on the second brood. In fact, only 16 per cent. was secured or 20 per cent. of the possible benefit due to direct



effect, which explains column 6 under "second brood," named under Direct Effect, "per cent. of possible benefit." Column 7 expresses the direct effect in terms of the "total benefit" for the season, and is secured by multiplying column 6 by column 3 of the check plot. The same explanation applies to the similar headings under "calyx" and "side," under Second Brood. In many cases no direct effect, whatever, is shown under the second brood, and it must be admitted that this method of ascertaining the direct effect on the second brood is rather complicated and not entirely satisfactory, but it seems to be mathematically correct, and the writer has been unable to devise any other means for expressing the matter. The following formulae may therefore be given:

(1) Per cent. Benefit, Direct Effect, Second Brood, = Per cent. Benefit per cent. of Total Fruit, 2d Brood, minus Per cent. Benefit, per cent. of Total Fruit, 1st Brood.

(2) Per cent. of possible per cent. benefit, direct effect, second brood, = (Per cent. benefit, per cent. of total fruit 2d brood, minus Per cent. benefit, per cent. of total fruit, first brood) divided by (100 minus per cent. benefit, per cent. total fruit, first brood.)

(3) Direct Effect Benefit in Total per cent. = Per cent. Direct Benefit 2d Brood X per cent. of total wormy check plot (2d brood.)

If we then wish to secure the amount of benefit due to the effect of the treatment through the first brood, both in destroying the first brood and also in thus preventing the increase of the second brood, exclusive of the direct effect of the treatment on the second brood, we must subtract the "Direct benefit as per cent. of total benefit" (column 9, second brood) from the "Total per cent. benefit" (last column), giving the "total per cent. benefit" due to action of the treatment on and through the first brood. If this be divided by the "total per cent. benefit" we secure the percentage of the total benefit which may be attributed to the effect of the treatment on and through the first brood, as given in column 12, under first brood, Table 16, expressed by the following:

Per cent. of Total benefit per cent., due to control of 1st brood =

Total per cent. benefit

Total per cent. benefit — Direct Benefit 2d brood in Total per cent.

Although these formulae and methods appear theoretically correct, it seems hardly possible that there was no direct effect upon the second brood by applying 10 lbs. of arsenate of lead at the third spraying as indicated in Table 17, next to last line, and that there was practically no direct effect on the second



brood in any of the plots in 1908. The further the matter is studied the more evident it becomes that the codling moth does not yield gracefully to being the subject of mathematical calculations.

#### COMPARISON OF INSECTICIDES.

In the orchard of H. H. Thompson at Walpole in 1906 the Greenings sprayed with 1 lb. arsenate of lead showed 49 per cent. benefit for the whole season, while those sprayed with 1-4 lb. Paris green showed 53 per cent. and 45 per cent. benefit, the insecticide being used with Bordeaux mixture in both cases. In DeMeritt's orchard in 1907 (see table 15), 1-3 lb. of Paris green per barrel of Bordeaux on trees 21 to 35 gave a benefit for the season of 44 per cent., while trees 41 to 45, sprayed with 2 lbs. arsenate of lead showed a benefit of 43 per cent. In the orchard of W. A. Deering, in 1907 (see table 16), plots 4 and 5, and 6 and 7, sprayed with 1-3 lb. Paris green per barrel of Bordeaux, showed a benefit for the season of 86 per cent. and 91 per cent. respectively, which benefit equals that of the plots sprayed in like manner with 2 lbs. arsenate of lead per barrel. These figures would tend to confirm the observations of other workers, that arsenate of lead has no advantage over Paris green for the codling moth when both are used with Bordeaux mixture. Where used without the Bordeaux mixture, there can be no doubt that the adhesive properties of the arsenate of lead would make it much superior to Paris green, though we have no experiments to demonstrate the fact. Trees 36 to 40 in the DeMeritt orchard in 1907 were sprayed with 2-3 lb. Paris green per barrel, against 1-3 lb. per barrel on trees 31 to 35, but showed only 4 per cent. more benefit for the whole season, showing that 1-3 pound per barrel is, probably, strong enough if properly applied.

As regards the amount of arsenate of lead to be used it is quite evident that two pounds per barrel are much superior to one pound. In the DeMeritt orchard in 1906 (see table 15) trees 51 to 55 received but one pound per barrel and showed but 11 per cent. benefit for the season, while trees 41 to 45 were given 2 lbs. per barrel and showed 43 per cent. benefit for the season. In the other orchards sprayed in 1906 with one pound of arsenate of lead per barrel, an average benefit of 66 per cent. was secured with the first two sprayings, but in 1907 and 1908 by the use of 2 pounds per barrel an average benefit of from 85 per cent. to 90 per cent. was secured with the same sprayings under

diverse conditions. Two pounds of arsenate of lead per barrel are practically the equivalent of 1-3 pound of Paris green in effectiveness, although containing slightly more arsenic.

The addition of soap has been frequently recommended as securing greater adhesiveness for the spray, and in spreading it more evenly on the foliage. In the Woodman orchard in 1907 (table 16) trees 437 and 438 had three pounds of Good's resin fish-oil soap added to each barrel of mixture, while the adjacent trees of plot 4 were sprayed the same way without the soap. The trees sprayed with the soap gave a benefit of 87 per cent. for the whole season, but very slightly more than those on which no soap was used. Also, in the Deering orchard in 1907 (table 18) plot 15 was given the fifth spraying for the second brood with the addition of three pounds of the resin soap, while plot 14 was sprayed in the same way without the soap, and the latter plot showed the greater benefit.

It has frequently been asserted that arsenate of lead is not as effective when used with Bordeaux mixture. A comparison of plots 3 and B in the Deering orchard in 1907 (table 16) with plot 13, the former having Bordeaux added, shows practically no difference in the benefit for the season. Nor do the benefits secured in 1907 on the orchards in which Bordeaux was used with the arsenate of lead differ materially from those secured that year and in 1908 on trees where only arsenate of lead was used.

#### THE TIME TO SPRAY AND HOW THE SPRAY EFFECTS THE LARVA.

*Terminology.* In speaking of the various sprayings, the first spraying, I, is that given just after the petals of the flowers drop. The second spraying, II, is that applied a week or ten days later. The third spraying, III, is applied when the eggs of the first brood are deposited and is usually three or four weeks after the petals drop. The fourth spraying was used for fungicide applications only and is not referred to in this discussion. The fifth spraying, V, is applied at the time of emergence of moths of the second brood or the first appearance of second brood larvae, and will usually be about the first week of August.

##### *The First Spraying. I.*

It has been generally conceded that the spraying just after the blossoms fall is the most important in fighting the codling moth, from the fact that as shown above, page 412, 65

per cent. of the first brood of larvae enter the apples through the calyxes. The object of the first spraying has, therefore, been to deposit the poison in the calyx cavity. Recently great emphasis has been placed by western entomologists upon the entire efficacy of one spraying if the lower calyx cavity be filled with poison by means of a hard driving spray, which will be further discussed below. It is a fact, however, that all investigators have shown that this first spray also materially reduces the number of larvae entering the sides of the apples, which could not be due to the poison in the calyx. Evidently those killed by the first spray which would otherwise have entered the side, must have been destroyed on the foliage or by eating into the surface of the sprayed apple. To determine the influence of the spray on the foliage as compared with that placed in the calyx by the first spraying several trees were sprayed by hand with a nasal atomizer so that the spray was deposited in the calyx of each apple, but practically none was placed on the foliage. Four trees, 442 to 445, were thus treated in the Woodman orchard in 1907; three trees in the same orchard, plot 2, in 1908; and four trees in the Deering orchard in 1908 (see tables 16, 17). The plots on which the atomizer was used gave a benefit for the whole season of 62 per cent., 78 per cent., and 84 per cent., respectively, averaging 75 per cent. Eight plots given the first spraying in the ordinary way so that the foliage was covered, averaged 82 per cent. benefit for the whole season. Analyzing this benefit as the effect on the first and second broods, and on those entering the calyx or side, we find that the trees treated with atomizers gave 21 per cent. benefit in "Total per cent. benefit" as regards the calyx, 25.8 per cent. as regards the side wormy, and 27.9 per cent. as regards the injury by the second brood. The eight plots given spray I in the usual way, gave 23.4 per cent. for the first brood—calyx, 27.3 per cent. first brood side, and 31 per cent. for the second brood, showing that the effect of both treatments must have been much the same on the larvae. This would seem to indicate that the spray on the foliage is of no value, but further experiments will show the contrary to be true. The benefit from this spraying is practically the same on those larvae entering the calyx or side of the apple, when applied either with the atomizer or by the ordinary manner. How the spray placed in the calyxes with an atomizer can destroy larvae which normally enter the sides of the apples and which therefore do not feed in the calyx, is a mystery which we have been unable to

solve, but the facts are very clearly shown by the figures of all three plots sprayed with the atomizer. The only possibility is that the larvae entering the sides of the apples are killed by eating the poisoned surface of the apple which would be poisoned even when the spraying was done with an atomizer, and the effect of placing bags over the apples before giving the third spraying, as described below, lends support to this explanation.

The time of the first spraying is a matter of vital importance. It has long been recommended that the spraying must be done before the calyx lobes close. Observation shows that in New Hampshire the calyces of the Baldwin apples (practically 90 per cent. of the apples marketed are Baldwins, and all references in this paper are to Baldwins unless, otherwise specified), close about a week after the last petals have dropped. It is safe to commence spraying after two-thirds of the petals have dropped, for the first flowers to drop are those which usually set as fruit, and by the time two-thirds of the petals have dropped, practically all flowers have been pollinated and there is no danger of injury to the flowers or to bees. The lack of effect of the spraying in the Hooper orchard at Walpole in 1906 (table 18), very clearly shows the necessity for spraying before the calyces close. We had expected to spray this orchard at the same time as that of Mr. Thompson, but the Hooper orchard was on a south slope and fully a week ahead of the Thompson orchard in maturity of blossoms. Practically no benefit whatever was shown by the spraying in the Hooper orchard, while an average of 50 per cent. benefit for the season was secured in the Thompson orchard. Had the Hooper orchard been sprayed with arsenate of lead a benefit would possibly have been secured from the effect of killing larvae outside of the calyx, as heavy rains occurred after the spraying and probably washed much of the Paris green off.

*Drenching vs. Mist Sprays.* As mentioned above it has been recently recommended that the first spraying be given with a high pressure and coarse, driving spray, so that it will be driven between the pillars of the stamens down into the lower calyx cavity, in which cavity it is claimed that the most of the eating by the young larva is done before tunnelling into the core. Remarkable results are claimed for such spraying, in contrast to the old method, in which the finest mist was thought the most desirable and economical. Assuming the correctness of the results secured in the West, though some of the records do not



bear close analysis, and feeling that the same methods might be equally efficient in New England, we arranged to contrast two plots given only the first spray, one in the ordinary manner with a fine mist, and the other with as high a pressure as possible, thoroughly drenching the tree with a coarse spray from Bordeaux nozzles. Such comparisons were made in two orchards in 1907 and in three orchards in 1908. In the two in 1907 and one in 1908 the drenching spray was given with a barrel pump which could not be kept at over 80 to 100 lbs. pressure. But on two of the 1908 plots the drenching was done with a gas sprayer giving 110 to 120 lbs. pressure, with no material difference in the results. If we compare the average Benefit in "Total

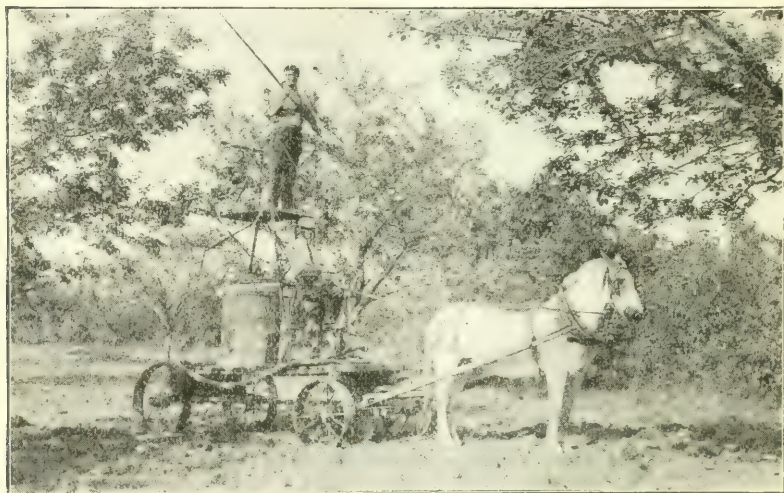


FIG. 33. Niagara gas sprayer outfit used in experiments at Durham.

Per Cent. Benefit" for the first brood for the plots sprayed with the mist or drenching spray, we find that both average 51 per cent. benefit. In some plots a decided advantage seems to be shown for the drenching spray, especially plot 1 of the Packers Falls orchard in 1908 (table 17) where the drenching gave 78 per cent. benefit for the season, while the mist gave only 60 per cent., and also in the other two orchards in 1908, in which the drenching gave 96 per cent and 80 per cent. in comparison with 92 per cent. and 73 per cent., respectively. But if the effect of this driving spray directed into the calyces, is to deposit the poison in the lower calyx cavity, a marked benefit should be

shown in the per cent. injured through the calyx. If we compare the different plots as regards "per cent. benefit, per cent. of first brood, injury through the calyx," (column 6, table 17), which should show the relative proportion entering the calyx or side as influenced by the different treatment, we find the figures absolutely contradictory. If we compare those entering the calyx in terms of "per cent. benefit, per cent. of total fruit," (column 8), we find a slight advantage for the drenched plots. But if we compare the benefit to the calyx in terms of "Total per cent. benefit," (column 10), there is practically no difference in favor of one treatment over the other. On the other hand, if we study this table further we find that in the case of plot I of the Packers Falls orchard in 1908 that the advantage of the drenching over the mist spray was clearly due to its effect on the second brood (see column 4 under second brood, table 17). It is entirely evident from the large amount of data from these five plots that the drenching spray has no particular advantage over the mist spray, except as it may deposit more material on the foliage and apple. The reason for this is readily found by a little study of the Baldwin apple. Dr. Ball\* has given us a figure which shows an apple with the calyx lobes still open "two weeks after blossoming," and with the stamen bars shrivelled sufficiently to allow the passage of spray between them to the lower calyx cavity. There can be no disputing the desirability of spraying so as to deposit a spray in the lower calyx cavity, where it is so possible, but a comparison of the structure of the Baldwin apple as it grows in New Hampshire, shows it to be entirely impossible, as the experiments cited corroborate. As mentioned above, the sepals usually close about one week or at most ten days after the blossoms drop. At this time the stamens are still entirely turgid and no spray can be forced between them, no matter how high the power or coarse the spray. If apples be examined a week or ten days after the sepals have entirely closed, the stamens will still be found turgid, as we have found by the examination of numerous specimens the present year. Unfortunately, we secured no photographs of this condition, but Prof. M. V. Slingerland has made the same observations independently† and has kindly permitted the reproduction of his photographs, Plate 20, which shows this structure very clearly. Such being the case, the question of a drenching, driving spray as compared with a mist spray, becomes one of cli-

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\* Bulletin Bureau of Entomology, No. 67, pg. 71, fig. 4.

† Journal of Economic Entomology, No. 6, Dec., 1908



mate and varieties, and which method will be most efficacious in any region cannot be dogmatically asserted until the method of growth of the apples in that region has been studied. There can be no question, however, that thorough spraying must be insisted upon. The old rule, spray until the tree commences to drip and then stop, still seems a safe one, and to spray until there are puddles under the tree is merely a waste of labor and material under New England conditions.

### *The Second Spraying. II.*

Until the last year or two it has been customary to recommend that the second spraying for the codling moth be made a week or ten days, or even two weeks, after the first spraying. Inasmuch as the calyces have closed at that time it is evident that such spraying can only be effective in the degree which it covers the foliage and apples. As the young larvae do not hatch for nearly a month after the first spraying, it is also evident that the second spraying, applied ten days after the first, might be more or less washed off by heavy rains before the young larvae had hatched and could be affected by it. We were led to question, therefore, whether the second spraying, so-called, was being applied at the right time. The results upon this matter are fairly uniform and conclusive. In the De-Meritt orchard in 1906 trees 11—16 received spray I, while trees 50—55 received I and II. As the latter plot was next to the check plot, with no barrier plot, it is evident that the moths of the second brood would have been more numerous upon it, and that the total benefit for the season, or, for the second brood, would not be reliable, as the figures show. But there should be a fair comparison of the effect of the addition of spray II to spray I as regards the effect on the first brood. Although sprays I and II gave slightly more benefit as regards calyx wormy by first brood, there was decidedly less benefit as regards those side wormy, and the total effect on the first brood was less than with spray I alone. Trees 46—50 were given the first and third sprayings in the same manner. Comparing the effect on the first brood we find that sprays I and III gave 15.9 per cent. benefit as "total per cent. benefit per cent." while sprays I and II gave only 5.5 per cent. Again comparing trees 26—30 with 21—25, the first of which were given sprays I and II with KLBP, and the second lot sprays I and III, it is found that the latter group had 49 per cent. benefit for the season against 41 per cent. for sprays I



## THE CLOSING OF THE APPLE CALYX.

A, A, and B, sections of apples at different stages in the closing of the calyx showing the stamens. C,—a later stage showing the closing of the calyx, but the stamen pillars still turgid. D.—young codling moth larva feeding in upper calyx cavity. (After Slingerland.)



and II, due to the greater benefit of the third spray on the second brood.

In Gilman Woodman's orchard in 1907 plot 5 was given spray II only and plot 6 spray III only. The former gave 25 per cent. benefit for the season and the latter 47 per cent., while other plots given only spray III, averaged 83 per cent. benefit.

In DeMeritt's orchard in 1908 plot 2 was given spray II only and plot 3 spray III only. The former gave 73 per cent. benefit for the season and the latter only 66 per cent., showing an advantage for spray II. This may be explained by the fact that there was practically no rain during the whole summer after either of these sprays, and that the season was an early one, so that the difference of ten days or two weeks in the time of application would make no difference. In the Smith orchard at Deerfield in 1907, plot 16 was given spray I and plot 14 sprays I and II, but the latter showed only 61 per cent. benefit for the season and the former 66 per cent. These figures do not prove that spray II is of no value, but do show that it is of less value than spray III, and in many cases of little, if any additional value when sprays I and III are given. The latter may be seen by comparing plot 3 of the Woodman orchard in 1907, which was given sprays I and II, with plot B which was given sprays I, II, and III, the latter showing 96 per cent. benefit for the season and the former 93 per cent., the larger benefit amounting to but 3 per cent., due to the second spraying being largely due to the increased effect on the second brood, due to the greater amount of poison on the foliage.

### *The Third Spraying. III.*

The reason for spray III, namely, that a spray should be applied as the young larvae are hatching, has already been intimated and its superiority to spray II has been shown. From the studies of the feeding habits of the young larvae, it must be evident that any poison deposited upon the foliage must kill many of them when feeding upon it before they seek the apples. Five plots have been sprayed with the third spraying only and have shown an average benefit of 70 per cent. for the whole season, against an average of 82 per cent. secured with spray I alone. An analysis of the influence of spray III shows that of the total benefit 33 per cent. is due to the effect on the second brood, 18 per cent. on the calyx wormy and 19 per cent. on the side wormy, first brood. It is interesting to note that the average effect of spray I and spray III

on the second brood is 31.3 per cent. and 32.6 per cent., respectively, showing practically no difference.

If the effect of spray III be due to the poison on the foliage only, then if the apples were covered and the foliage of the tree then sprayed there should be as much benefit as if the apples had been sprayed also. But if there is less benefit with the apples covered it is evident that the difference in the benefit must represent the value of the spray deposited on the apples. Such an experiment was made twice. In 1907 one tree in the Woodman orchard, table 16, tree 448, was given spray III, after all of



FIG. 34. Tree 448 of the Woodman orchard, Durham, N. H., 1907, with the apples bagged during spray III.

the apples had been covered with paper bags, which were removed immediately after the spraying. Care was taken to cover only the stems and not the nearby foliage. It was intended to treat several trees thus but the vast amount of labor involved in bagging all the apples (3924) on even one large tree prevented a larger experiment. In 1908 four trees in the Deering orchard, table 17, Plot 3A, were similarly bagged. These were smaller trees with a light crop of fruit, totalling only 668 for the four trees. It is evident, therefore, that the one large tree was fully



as fair a test as the four small ones. The one tree gave a benefit for the season of 52 per cent., while the four in 1908 showed only 24 per cent. benefit, the two averaging 38 per cent., of which 9 per cent. is the effect on the first brood and 29 per cent. on the second brood. In 1907 the effect was practically all on the second brood, 46.8 out of 52 per cent., while in 1908 12 per cent. of the effect was upon the first brood and 11.6 per cent. on the second brood, or about the same proportion as occurs with spray III when the apples are exposed. It seems more probable the latter condition would be the normal effect of such spraying the foliage only as regards influence on the proportion of first brood and second brood larvae. Thus, about 50 per cent. of the effect of spray III on the first brood larvae, and 58 per cent. of the effect on the second brood, must be due to the spray on the foliage, and the balance must be due to the spray deposited on the apples. It should be pointed out that spray III may effectually reduce the number of larvae entering the calyx though no spray be deposited in the calyx for we, and others, have observed that very often the larvae eat their way through one of the sepals, rather than going to the apex and entering between them.

From the above data we would naturally infer that the best results would be secured by combining sprays I and III, and such has been our advice and that of several other investigators for the past two years. Our evidence as to the value of giving spray III in addition to spray I, is not entirely satisfactory, but is as follows: In 1906 in the DeMeritt orchard, trees 11—15, given only spray I, showed but 14 per cent. benefit for the season, while trees 46—50, given sprays I and III, showed 31 per cent. benefit, this being due to the superior effect of the addition of spray III on the first brood. In the Woodman orchard in 1907, plots given spray I only gave 91 and 89 per cent. benefit for the season, while one plot given sprays I and III, showed only 93 per cent. benefit for the season. In the Woodman orchard in 1908, plot B (barrier plot), sprayed with I and III, showed no more benefit as regards the first brood than plots 1 and 3 given only spray I, and showed less benefit for the whole season, probably due to the inroads from the neighboring check plot of the second brood of moths. In the Packer's Falls orchard in 1908 the plot given I and III, though 10 lbs. arsenate of lead per barrel were used at the third spraying, showed less benefit than the plots given only spray I. This is doubtless due to the small number of fruits and the scattered nature of the



bearing trees, making fair comparison impossible. In the Deering orchard in 1908, two plots having only spray I, showed 73 per cent. and 80 per cent. benefit for the season, while two plots which had spray I and III, showed 87 and 78 per cent., or an average of 82.5 per cent. against 76.5 per cent., or a gain of 6 per cent. Two plots in the DeMeritt orchard were given sprays I and III in 1908, and showed 80 and 89 per cent. benefit for the season or an average of 84.5 per cent. This orchard had about the same amount of worminess on unsprayed trees as the Deering orchard. It should be remembered that 1908 was a dry season and there was practically no rain to wash off the first spraying, so that the third would not be of as much value as in 1906, when there were heavy rains. As regards the value of spray III, the only conclusion possible is, that if no rains occur after spray I, that the application of spray III will be of doubtful value when unsprayed trees show not over 50 per cent. worminess for the season. If for any reason spray I cannot be given, or if spray I is followed by rains, a spraying should be given about three to four weeks after the blossoms fall (spray III) by all means.

*How the larvae are killed.* If we attempt to determine just how the larvae are killed by the first spraying we find that the statistics in tables 16, 17 and 18 are full of inexplicable inconsistencies and contradictions. They represent, however, probably as careful and extensive attempts to determine these matters as have ever been made. The benefit shown by spray III and the fact that it is due both to the spray on the foliage and on the apples, in almost equal proportion, would seem to indicate that the effect of spray I, as far as it is deposited outside of the calyx is much the same. But when we attempt to push the analysis of the figures further by means of comparisons which it would seem should throw light on the matter, we meet with failure. The general facts seem quite evident, however, that if the foliage as well as the calyces be thoroly sprayed, that there is almost an equal chance that the larva may be killed by eating the foliage or surface of the apple, or by feeding in the calyx, and we would venture the opinion, which we would not attempt to prove by the statistics, though it is based upon them, that in New Hampshire on the Baldwin apple, about half of the larvae are killed in the calyx and about half by feeding on the foliage or surface of the apple.

*The Fifth Spraying, V.*

The fifth spraying is designed to cover the foliage and apples with poison so as to destroy the young larvae of the second brood, and is therefore applied when the moths of the second brood commence to appear early in August.

Plot A of the Woodman orchard was given sprays I, III and V in 1907, but showed no greater benefit than plot 3 with only sprays I and III. Plots 14 and 15 of the Deering orchard were given only spray V in 1907 and showed 52 per cent. benefit, but of this 32 per cent. was due to benefit to the first brood and 20 per cent. to the second brood. It is impossible to see how the fifth spraying could benefit the first brood, yet there seems to be no other explanation of the records, and it is evident that spray V alone gave considerable benefit. It should be stated, however, that these two plots were mostly Ben Davis, while the check plots were McIntosh Red and Baldwin, which may be a disturbing factor in the comparison. As a general rule, however, Ben Davis is more affected by the Codling moth than most varieties. Plot 4 of Packers Falls orchard (Table 17) was given sprays I, III and V in 1908, and showed 72 per cent. benefit. Plot 3, which was given spray I with the same amount of arsenate of lead (2 lbs. per barrel), and spray III with 10 lbs. per barrel, showed 75 per cent. benefit. The two plots gave practically the same benefit from injury by the first brood, but plot 3 gave slightly more benefit for second brood injury.

This would indicate that a larger amount of lead at the third spraying would be as effective as adding the fifth spraying, but as 1908 was a dry season, this might not always prove true.

Altho our experimental evidence as to the value of spraying for the second brood is thus largely negative and rather unsatisfactory from many standpoints, yet further experiments were not thought advisable in view of the excellent results secured from sprays I and III, these proving so effective that with but a small second brood another spraying could hardly prove profitable even if somewhat beneficial.

#### EFFECT OF SPRAYING ON THE AMOUNT AND WORMINESS OF DROPPED AND PICKED FRUIT.

The effect of the different sprayings upon injury by the first and second broods is a matter of interest to the entomologist and of importance in forming a basis for his recommendations, but the orchard owner is chiefly interested in the effect of the spraying on the amount of picked fruit free from worms.

TABLE 8. *Injury by Codling Moth in Orchard of Arthur Ladd, Deerfield, N. H., in 1907.*  
Plot C. No treatment.

Tree.	Total Apples.	FIRST BROOD.				SECOND BROOD.				TOTAL.			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
C1	D.*	559		24		46		41		97		65	
	T.†	688	49	24	47	53	51	44	83	104	15.1	68	65
C2	D.	539		27		34		23		107		50	
	T.	692	63	28	36.3	45	37	29	64.4	122	15.3	57	46
C3	D.	364		20		24		19		79		39	
	T.	527	63	23	35.3	38	37	27	71	103	19.5	50	48.5
C4	D.	234		14		12		9		47		23	
	T.	297	76	15	38.4	12	24	9	75	51	17.1	24	47
C5	D.	365		36		17		13		116		49	
	T.	448	84	37	35.9	20	16	16	80	123	27.4	53	43
C6	D.	352		13		15		13		65		26	
	T.	483	72.5	20	34.4	22	27.5	16	72.7	80	16.5	36	45
C7	D.	135		37		3		2		40		14	
	T.	181	87	13	32.5	6	13	5	83.3	46	25.4	18	39
C8	D.	186		17		11		10		55		27	
	T.	214	79	17	36.9	12	21	11	91.6	58	27.1	28	48
Total	D.	2734		163		162		130		606		293	
	T.	3530	70	177	34.9	208	30	157	75.4	687	19.4	334	48

Plot A. Treatment. Spray I, II. 2 lbs. arsenate of lead and Target Quick Bordeaux.

A1	D.	396	26	15	6	32.5	11	84.6	32	19
	T.	1462	27	15	13	32.5	11	84.6	40	26
A2	D.	926	49	35	15	32	13	92.6	64	48
	T.	2126	57	42	27	32	25	92.6	84	67
A3	D.	805	24	16	17	44.3	15	94.3	41	31
	T.	1909	29	16	23	44.3	21	94.3	52	37
A4	D.	134	12	7	0	0	0	0	12	7
	T.	535	16	7	0	0	0	0	16	7
A5.	D.	174	14	1	7	35	6	88.8	21	10
	T.	690	17	1	9	35	8	88.8	26	12
Total	D.	2435	125	77	45	333	38	90.2	170	115
	T.	6722	146	84	72	333	65	90.2	218	149

D. = Drops.

T. = Total for season; drops and picked.



Plot D. Treatment, Spray I, II. 2 lbs, arsenate of lead and 3:4 Bordeaux per barrel.

D51	D.	180	6	2	0	0	6	2						
	T.	720	8	72.7	2	25	3	100	11	1.5	5	45		
D52	D.	24	3	•	2	0	0	2	3	2				
	T.	295	8	80	2	25	2	20	2	100	10	5.3	4	40
D53	D.	6	1	1	0	0	0	0	1	1				
	T.	389	7	58.3	1	14.2	5	41.7	5	100	12	3	6	50
D54	D.	258	16	12	1	0	17	12	12	12				
	T.	937	25	83.3	12	48	5	16.7	4	80	30	3.2	16	53
D55	D.	126	11	9	0	0	11	9	9	9				
	T.	925	14	63.6	9	62.2	8	36.4	8	100	22	2.3	17	77
Total	D.	594	37	26	1	0	38	26	26	57				
	T.	3266	62	73	26	41.9	23	27	22	95.6	85	2.6	48	57

Plot E. Treatment, 5 lbs. Pyrox per barrel. Spray I, II.

E56	D.	1315	26	15	24	21	50	36						
	T.	3114	30	38.4	18	60	48	61.6	44	91.6	78	2.5	62	80
E57	D.	795	14	8	28	22	42	30						
	T.	2113	21	33.8	15	71.4	41	66.2	35	85.3	62	2.4	50	80
E58	D.	1005	29	21	11	10	40	31						
	T.	2603	31	53.4	21	70.9	27	46.6	26	96.2	58	2.2	48	82
E59	D.	463	14	12	13	10	27	22						
	T.	1404	20	55.5	17	85	16	44.5	13	81.2	36	2.5	30	83
E60	D.	328	15	11	3	3	18	14						
	T.	1159	21	63.6	15	71.4	12	56.4	12	100	33	2.8	27	81
E61	D.	495	23	15	10	9	33	24						
	T.	1557	36	69.2	22	61.1	16	30.8	14	87.5	52	3.3	36	69
Total	D.	4401	121	82	89	75	210	157						
	T.	11950	159	49.8	109	68.5	160	50.2	144	90	319	2.6	253	79



TABLE 8.—Continued.

Plot F. Treatment. Spray I, II. 2:4 Bordeaux and 2 lbs. arsenate of lead per barrel.

Tree.	Total Apples	FIRST BROOD			SECOND BROOD			TOTAL		
		Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy
F62	D. 480	7		3	17		14	24		17
	T. 1542	13	35.1	7	24	64.9	20	83.3	2.3	27
F63	D. 428	18		11	15		15	33		26
	T. 1288	20	43.4	13	26	56.6	26	46	3.5	39
F64	D. 637	23		19	17		13	40		32
	T. 2016	27	46.5	21	31	53.5	25	58	2.8	46
F65	D. 833	38		21	29		15	58		36
	T. 2748	46	56.7	27	35	43.3	29	81	2.9	56
F66	D. 895	21		19	19		16	40		35
	T. 2262	28	45.9	23	33	54.1	29	61	2.6	52
F67	D. 289	10		9	8		8	18		17
	T. 871	17	50	16	17	50	17	34	3.9	33
<b>Total</b>	D. 3562	117		82	96		81	213		163
	T. 10727	151	47.6	107	166	52.4	146	317	2.9	253

*Injury by Codling Moth in orchard of John Smith, Deerfield, N. H. in 1907.*

	Plot H-20. No Treatment.								
101	D. T.	328 391	45 49	9 85.9	9 18.3	6 14.1	0 0	51 57	9 15
102	D. T.	297 321	25 25	6 80.6	6 25	6 19.4	3 3	31 31	9 9
103	D. T.	340 343	29 29	9 87.8	9 31	4 12.2	3 3	33 33	12 12
104	D. T.	367 369	48 48	13 90.5	13 27	5 9.5	4 4	53 53	17 17
105	D. T.	1089 1152	121 124	32 93.9	32 25.8	8 6.1	3 3	129 132	35 35
Total	D. T.	2421 2576	268 275	69 89.9	69 25	29 31	13 13	297 306	82 82



Plot 16. Treatment, Spray I. 2 lbs. arsenate of lead and 2:4 Bordeaux mixture per barrel.

77	D.	565	18	10	5	4	23	14					
	T.	1768	47	28	59.5	6	11.4	5	83.3	53	2.9	33	62
78	D.	381	23	11	6	4	29	15					
	T.	1707	53	34	64.1	10	15.8	8	80	63	3.6	42	66
79	D.	679	24	8	3	3	27	11					
	T.	2429	56	29	51.7	11	16.5	11	100	67	2.7	40	59
80	D.	651	35	9	5	5	40	14					
	T.	2433	83	41	49.3	15	15.4	11	73.3	98	4	52	53
81	D.	275	26	12	1	1	27	13					
	T.	1190	52	25	48	9	14.8	9	100	61	5.1	34	55
82	D.	525	56	21	7	5	63	26					
	T.	1216	75	31	41.3	8	9.7	6	75	83	6.8	37	44
Total	D.	3076	182	71	27	22	209	93					
	T.	1074	366	188	59	50	84.7	425	3.9	238	56		

TABLE 9. *Injury by Codling Moth in Orchard of W. A. Deering, Pittsfield, N. H., in 1907.*

Tree.	Plot C. No Treatment.					
	FIRST BROOD			SECOND BROOD		
	Total Apples	Total Wormy	Per cent.	Total Wormy	Per cent.	TOTAL Per cent.
C2	D. 379 T. 875	91 94	41 44	33 137	27 109	124 231
C3	D. 804 T. 1554	174 176	62 45	51 211	43 211	225 387
C5	D. 1021 T. 2410	276 279	95 46	83 316	61 236	359 595
C7	D. 828 T. 1856	154 159	38 46	72 186	55 144	226 345
C8	D. 1148 T. 2345	219 221	24 57	63 162	45 43	282 383
Total	D. 4180 T. 9040	914 929	33 48	302 1012	231 786	1216 1941
Plot A. Treatment, Sprays I, II, III. 3:4 Bordeaux only.						
A2	D. 1571 T. 2526	234 234	60 52	62 212	52 146	296 446
A3	D. 1250 T. 1490	217 218	49 69	45 94	28 66	262 312
A4	D. 488 T. 1481	96 96	43 50	91 96	68 71	187 192
Total	D. 3309 T. 5497	547 548	27 57	198 402	148 283	745 950
						112 206
						48
						77
						115
						37
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						59
						111

Plot 1. Treatment, Sprays I, II mist. 2 lbs. arsenate of lead and 3:4 Bordeaux per barrel.

11	D.	316	10	1	3	2	13	3
	T.	977	10	38	16	13	26	14
				10	62	81	2.6	53
12	D.	715	33	2	3	2	36	4
	T.	921	33	86	5	3	38	5
				6	14	60	4.1	13
13	D.	89	6	1	1	1	7	2
	T.	276	6	66	3	3	9	4
				16	33	100	3.2	44
14	D.	1994	56	5	13	9	69	14
	T.	3149	56	64	31	25	87	30
				8.9	36	80	2.8	34
16	D.	1754	40	5	2	0	42	5
	T.	2593	40	83	8	6	48	11
				12	17	75	1.8	23
18	D.	1317	26	6	2	2	28	8
	T.	2712	27	66	15	13	42	20
				26	34	92	1.5	47
19	D.	1492	35	3	5	2	40	5
	T.	2814	35	70	15	12	50	15
				8.5	30	80	1.7	30
Total	D.	7677	206	23	29	18	235	41
	T.	13442	206	69	93	75	299	99
				11	31	81	2.2	33



TABLE 9.—Continued.

Plot 2. Treatment, Sprays I, II drenched 2 lbs. arsenate of lead and 3:4 Bordeaux per barrel.

Tree.	FIRST BROOD				SECOND BROOD				TOTAL			
	Total Apples	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
210	D.	130	3	0	0	0	0	0	3	.6	0	0
	T.	497	3	100	0	0	0	0	3		0	
211	D.	359	10	1	0	0	0	0	10	1.8	1	47
	T.	928	10	59	7	41	7	100	17		8	
212	D.	647	15	2	1	1	1	90	16	1.6	3	44
	T.	1497	15	60	10	40	9	90	25		11	
213	D.	10	1	1	0	0	0	0	1	.9	1	100
	T.	115	1	100	0	0	0	0	1		1	
214	D.	103	5	2	3	45	3	100	8	5.6	5	66
	T.	166	5	55	4	45	4	100	9		6	
215	D.	184	2	0	3	60	2	66	5	1.1	2	40
	T.	419	2	40	3	60	2	66	5		2	
216	D.	255	4	3	12	78	12	92	16	3.1	15	88
	T.	569	4	22	14	78	13	92	18		16	
217	D.	225	3	1	12	82	12	93	15		13	81
	T.	533	3	16	13	82	12	93	16	3	13	
Total	D.	1918	43	10	31	55	30	93	74	2	40	60
	T.	4724	43	45	51	55	47	93	94		57	

Plot 3 and Plot B. Treatment, Sprays I, II, III. 2 lbs. arsenate of lead and 3.4 Bordeaux per barrel.

318	D.	13	1	1	0	0	0	1	1	1
	T.	33	1	100	0	0	0	1	3	100
320	D.	273	6	3	0	0	0	6	6	3
	T.	934	6	100	0	0	0	6	.64	50
322	D.	40	1	1	1	1	1	2	2	2
	T.	321	1	100	1	50	1	100	.6	100
323	D.	226	3	1	0	0	0	3	3	1
	T.	508	3	75	1	23	1	100	.8	50
324	D.	116	3	1	0	0	0	3	3	1
	T.	501	3	60	2	40	2	100	1	60
Total	D.	638	14	7	1	1	1	13	13	8
	T.	2297	14	77	4	23	4	100	.78	61
132	D.	1237	26	5	3	3	3	29	8	53
	T.	2767	26	55	21	45	21	100	1.7	53
131	D.	300	12	8	1	3	4	16	12	70
	T.	771	12	70	3	30	4	80	2.2	70
Total	D.	1537	38	13	7	7	7	45	20	60
	T.	3538	38	59	26	41	25	96	1.8	60
Total Plots 3 and B.			63	38	37	96	1.4			



Plots 8, 9, 10, 11 and 12. Treatment, Sprays I, II. 2 lbs. arsenate of lead and benzoate of soda bordeaux mixtures.

Plot. Trees.		Plot 14. Treatment, Spray V. 2 lbs. arsenate of lead per barrel.									
S	J2	D.	T.	119	52	43	52	48	47	171	99
9	6	D.	T.	6717	119	52	52	110	99	90	65
		D.	T.	956	41	18	14	14	13	55	31
10	5	D.	T.	2977	51	60	19	34	30	88	49
		D.	T.	1234	25	12	7	7	7	32	19
11	6	D.	T.	2772	28	65	15	35	14	93	29
		D.	T.	1339	56	21	18	18	15	74	36
12	6	D.	T.	4518	57	40	22	39	76	90	69
		D.	T.	362	18	8	0	0	0	18	8
Total	35	D.	T.	1503	19	61	8	42	12	39	31
		D.	T.	6254	259	51	111	91	82	350	193
109	D.	T.	18487	274	51	42	116	256	231	530	317
		D.	T.	69	6	15	5	14	9	20	14
112	D.	T.	258	6	15	83	5	34	25	73	39
		D.	T.	116	28	16	15	15	5	43	21
115	D.	T.	1151	31	38	17	51	50	35	70	52
		D.	T.	71	6	38	4	5	1	11	5
116	D.	T.	183	6	38	4	66	10	6	60	10
		D.	T.	386	55	58	29	19	14	74	43
Total	D.	T.	744	58	58	50	29	42	32	100	61
		D.	T.	642	95	55	54	53	29	148	83
		D.	T.	2336	101	42	55	136	98	237	153
		D.	T.			55		58		72	61
		D.	T.							10	61
		D.	T.								

TABLE 9.—Continued.

Plot 15. Treatment, Spray V. 2 lbs. arsenate of lead and 3 lbs. resin soap per barrel.

Tree.	Total Apples	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
123	D.	104	16	4	53	12	14	47	8	28	30	14	46
	T.	166	16	4	25								
126	D.	338	26	14		22		16		48		30	
	T.	1314	28	14	50	68	71	51	75	96	7.3	65	66
129	D.	237	19	13		19		14		38		27	
	T.	1126	22	14	63	86	80	68	78	108	9.6	82	76
131	D.	212	27	17		65		52		92		69	
	T.	863	27	17	63	129	83	103	78	156	18	130	83
Total	D.	941	88	48		118		90		206		138	
	T.	3469	93	49	52	297	76	232	78	390	11	281	72
Plots 14 and 15, average					30		53		70		10		
Plot 6. Treatment, Sprays I, II. Paris green 1-3 lb. and Copper Phosphate 10 lbs. per barrel.													
638	D.	507	20	1		3		3		23		4	
	T.	1255	21	1	4.7	36	64	30	83	57	4.5	31	51
639	D.	134	2	2		4		4		6		6	
	T.	887	2	2	100	7	78	6	85	9	1	8	88
641	D.	333	5	3		3		3		8		6	
	T.	1637	5	3	60	4	45	4	100	9	.3	7	77
642	D.	961	16	2		5		5		21		7	
	T.	2553	17	3	17	26	61	24	92	43	1.7	27	63
Total	D.	1935	43	8		15		15		58		23	
	T.	6382	45	9	20	73	62	64	87	118	1.8	73	62

Plot 7. Treatment, Sprays I, II., same as Plot 6 with Lime added.

743	D.	529	11	3	6	6	17	9
	T.	1957	11	3	27	15	58	17
						14	93	26
								1.3
744	D.	449	11	1	2	2	13	3
	T.	873	11	1	9	15	58	15
						14	93	26
								1.8
745	D.	867	18	4	6	6	24	10
	T.	2977	18	4	22	15	46	19
						15	100	33
								1.4
746	D.	700	10	0	6	6	16	6
	T.	1779	10	0	0	16	62	16
						16	100	26
								1.4
747	D.	1031	31	12	5	4	36	16
	T.	2911	32	13	40	38	55	50
						37	97	70
								2.4
748	D.	1183	25	3	7	7	32	10
	T.	2970	25	3	12	42	66	67
						40	95	43
								2.6
								64
Total	D.	4759	106	23	32	31	138	54
	T.	13467	107	24	24	136	496	150
								1.8
								60
Plots 6 and 7, total average.			41	22	59	93		1.8



TABLE 9.—*Concluded.*

Plot 5. Treatment, Sprays I, II, with 1-3 lb. Paris green and 2:4 Bordeaux and spray III with Kerosene-limoid-bordeaux, 10 per cent. kerosene and 1-3 lb. of Paris green per barrel.

Tree.	Total Apples	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
533													
D.	153	9		1		2		2		11		3	
T.	666	12	45	3	25	14	55	12	85	26	3.9	15	58
534													
D.	460	11		3		3		2		14		5	
T.	1598	11	45	3	27	13	55	11	84	24	1.5	14	58
535													
D.	675	19		3		3		2		22		5	
T.	2240	19	22	3	15	67	78	65	97	86	3.9	68	79
536													
D.	671	52		16		25		21		77		37	
T.	2591	53	44	16	30	69	66	60	85	122	4.7	76	62
537													
D.	623	15		2		5		5		20		7	
T.	2783	16	32	2	12	34	68	32	94	50	1.4	34	68
Total													
D.	2582	106		25		38		32		144		57	
T.	9878	111	36	27	24	197	64	180	94	307	3.4	207	66

Plot 4. Treatment, Sprays I, II, III, 1-3 lb, Paris green and 2:4 Bordeaux per barrel.

426	D. T.	199 812	4 4	40 4	4 100	4 6	3 4	66 66	8 10	1 2	7 8	80
427	D. T.	31 162	0 0	0 0	0 4	2 4	1 3	75 75	2 4	2 2	1 3	73
428	D. T.	203 704	6 6	50 50	1 1	0 6	0 5	83 83	6 12	1 1	6 6	50
429	D. T.	109 419	3 3	43 43	1 1	1 4	1 4	100 100	4 7	1 1	3 3	71
431	D. T.	94 244	1 1	33 33	1 1	3 3	1 1	100 100	3 3	1 1	3 3	66
432	D. T.	475 1504	10 10	39 39	4 4	13 16	12 15	93 93	23 26	1 1	16 19	73
435	D. T.	114 358	8 8	61 61	3 3	3 5	3 4	80 80	11 13	3 6	6 7	51
Total	D. T.	1225 4203	32 32	42 42	14 11	23 43	21 36	83 83	57 75	1 1	33 30	66
Plots 4 and 5, total average.		37	28	63	27	27	27	27	27	27	27	27

TABLE 10. *Injury by the Codling Moth in the Orchard of Gilman Woodman, Durham, N. H. in 1907.*  
Plot C. No Treatment.

Tree.	Total Apples	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
C1													
D.	2041	317		57		62		45		379		121	
T.	6796	342	<b>32</b>	100	<b>29</b>	724	<b>68</b>	390	<b>54</b>	1066	<b>14</b>	490	<b>46</b>
C3													
D.	1017	217		66		43		16		260		82	
T.	4278	226	<b>25</b>	72	<b>30</b>	395	<b>75</b>	295	<b>42</b>	931	<b>21</b>	368	<b>40</b>
C5													
D.	2799	583		190		139		75		722		265	
T.	8458	625	<b>32</b>	214	<b>34</b>	1313	<b>68</b>	437	<b>33</b>	1938	<b>23</b>	651	<b>33</b>
C6													
D.	709	148		23		125		32		273		55	
T.	1255	153	<b>26</b>	24	<b>15</b>	421	<b>74</b>	58	<b>13</b>	574	<b>46</b>	82	<b>14</b>
C7													
D.	398	74		30		65		34		129		64	
T.	942	81	<b>21</b>	34	<b>42</b>	302	<b>79</b>	118	<b>39</b>	383	<b>40</b>	152	<b>40</b>
C8													
D.	2450	479		131		111		55		530		186	
T.	8301	556	<b>31</b>	161	<b>29</b>	1235	<b>69</b>	367	<b>29</b>	1791	<b>21</b>	528	<b>30</b>
C9													
D.	1725	353		78		194		86		547		164	
T.	6029	408	<b>27</b>	94	<b>23</b>	1099	<b>73</b>	273	<b>25</b>	1567	<b>25</b>	367	<b>24</b>
Total													
D.	11139	2171		595		739		343		2910		938	
T.	26059	2401	<b>29</b>	699	<b>29</b>	5789	<b>71</b>	1939	<b>33</b>	8190	<b>22.5</b>	2638	<b>32</b>

Plot 1. Treatment, Spray 1, mist, 2 lbs. arsenate of lead.

11	D. T.	750 3575	9 12	48	2	5	13 55	82	11 48	87	22 67	13 53	79
12	D. T.	581 4990	9 12	26	3 6	50	12 33	74	11 30	90	21 45	14 36	80
13	D. T.	1230 6087	24 27	31	6 8	30	22 59	59	16 43	72	46 86	22 51	59
14	D. T.	1186 6171	12 12	8, 5	8 8	66	23 128	91, 5	17 92	70	35 110	25 100	71
16	D. T.	788 3193	25 30	25	6 10	33	53 91	75	32 68	74	78 121	38 78	65
<b>Total</b>	D. T.	4735 24316	79 93	20	25 31	39	123 366	80	87 281	76	302 459	112 318	69

Plot 2. Treatment, Spray 1, drenched, 2 lbs. arsenate of lead.

22	D. T.	210 2446	9 10	26	4 4	40	3 28	74	3 25	89	12 38	7 29	76
17	D. T.	370 2865	17 21	36	6 9	43	6 37	61	6 31	83	23 58	12 40	69
16	D. T.	81 500	12 15	14	3 4	26	10 90	86	9 29	32	22 105	12 33	31
11	D. T.	676 2298	30 30	39	4 4	13	3 46	61	3 39	94	33 76	7 43	56
<b>Total</b>	D. T.	1337 8109	68 76	28	17 21	27	23 201	72	21 124	61	90 277	38 145	52

TABLE 10.—Continued.

Plot 4 B. Treatment, Spray I with atomizer, 2 lbs. arsenate of lead per barrel.

Tree.	Total Apples	FIRST BROOD			SECOND BROOD			TOTAL		
		Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy
442	D. 220 T. 2424	25 25	27	13 13	6 65	73	6 44	31 90	3.7	19 57
443	D. T.	482 2711	57 57	39 39	19 19	61	14 55	75 144	5.3	33 74
444	D. T.	1340 4886	156 159	33 36	36 315	67	82 161	263 474	10	118 197
445	D. T.	904 2839	93 94	27 27	38 247	73	22 119	131 341	42	49 137
Total	D. T.	2946 12360	331 335	32 32	95 714	68	124 370	500 1049	8.3	229 465
Plot 5. Treatment, Spray II. 2 lbs. arsenate of lead per barrel.										
555	D. T.	826 2554	253 256	53 53	69 70	28	45 134	320 497	49	114 201
556	D. T.	826 2421	138 139	33 34	38 252	65	27 124	176 491	60 43	60 138
557	D. T.	548 2455	107 109	49 49	35 36	33	33 199	160 565	20	68 235
558	D. T.	607 2846	158 163	31 31	43 313	69	22 154	204 506	47	75 197
559	D. T.	147 481	52 54	27 27	9 10	18	10 58	66 195	40	19 68
Total	D. T.	2754 11537	708 721	33 33	189 195	26	147 669	926 2154	48	336 864

Plot 6. Treatment, Spray III. 2 lbs. arsenate of lead per barrel.

673	D. T.	216 968	74 75	30	12 13	17	24 175	70	9 71	42	83 250	25	21 87	34
674	D. T.	1076 3376	163 166	39	54 55	33	34 251	61	21 123	49	197 417	12	75 178	42
675	D. T.	880 2426	112 113	37	23 24	21	23 193	63	10 92	50	135 306	12	33 178	42
676	D. T.	1113 3808	192 196	46	46 48	24	20 226	61	11 87	38	212 122	11	57 135	32
677	D. T.	22 248	8 11	14	1 2	18	0 65	86	0 21	37	8 76	30	1 26	33
Total	D. T.	3307 10826	549 561	38	156 142	25	101 910	62	51 400	11	650 1171	43	187 512	30
Average 674-676				41		25		59		45		12		



TABLE 10.—Continued.

Plot 1A. Treatment, Spray III, in usual manner from above; 2 lbs. arsenate of lead per barrel.

Tree.	FIRST BROOD				SECOND BROOD				TOTAL			
	Total Apples	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy
439	D. 821	94		19	21		17	115		36		
	T. 5278	107	<b>51</b>	29	103	<b>49</b>	31	210	<b>4</b>	69	<b>27</b>	
440	D. 1134	89		21	6		4	95		25		
	T. 5556	112	<b>52</b>	36	102	<b>48</b>	18	214	<b>3.9</b>	54	<b>25</b>	
441	D. 932	77		29	8		6	85		26		
	T. 4690	77	<b>37</b>	29	128	<b>63</b>	52	205	<b>4.3</b>	72	<b>35</b>	
Total	D. 2890	260		60	35		27	295		87		
	T. 15524	296	<b>47</b>	85	333	<b>33</b>	101	629	<b>4</b>	186	<b>29</b>	

Plot 4B. Treatment, Spray III, from above and below; 2 lbs. arsenate of lead per barrel.

446	D. 1165	97		19	8		5	105		24		
	T. 4197	not recorded										
447	D. 1054	121		17	13		5	134		22		
	T. 3991	121	<b>71</b>	17	48	<b>29</b>	23	169	<b>4.2</b>	40	<b>24</b>	

Plot 4D. Treatment. Same as Plot 4A plus 3 lbs. resin soap per barrel.

437	D. 871	95		23	21		16	116		39		
	T. 4289	102	<b>57</b>	27	76	<b>43</b>	27	178	<b>4.1</b>	54	<b>30</b>	
438	D. 692	67		25	8		7	75		32		
	T. 3817	73	<b>68</b>	30	33	<b>32</b>	9	110	<b>2.7</b>	39	<b>35</b>	
Total	D. 1563	162		48	29		23	191		71		
	T. 8106	175	<b>61</b>	57	109	<b>39</b>	36	284	<b>2.8</b>	93	<b>33</b>	

Plot 4C. Treatment. Same as Plot 4A but apples bagged during spraying.

448	D.	1696	205	45	24	19	229	64
	T.	3924	206	45	21	88	417	133
								34

Plot 3. Treatment, Sprays I and III. 2 lbs. arsenate of lead per barrel.

330	D.	453	20	7	8	7	28	14
	T.	3232	21	8	36	32	57	40

331	D.	527	11	3	3	3	14	6
	T.	2867	12	24	33	22	36	26

332	D.	505	13	8	7	7	20	15
	T.	3135	13	8	47	41	60	49

Total	D.	1485	44	18	70	17	62	35
	T.	9334	46	20	43	95	153	115

Plot B. Treatment, Sprays I, II, III. 2 lbs. arsenate of lead per barrel.

B1	D.	1300	28	7	0	0	28	7
	T.	2832	28	7	25	9	40	16

B2	D.	876	29	4	11	11	40	15
	T.	5636	29	53	14	25	54	29

B3	D.	331	15	4	6	6	21	10
	T.	5739	15	51	26	14	29	18

B4	D.	473	17	3	2	2	19	4
	T.	5153	18	66	15	9	27	12

B5	D.	264	10	7	10	10	20	17
	T.	4377	10	18	70	41	56	48

Total	D.	3444	99	24	52	29	128	53
	T.	23737	100	48	25	98	206	123

TABLE 10.—*Concluded.*

Plot A. Treatment, Sprays I, III, V. 2 lbs. arsenate of lead per barrel.

Tree.	Total Apples	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
D. A3	778	26	3	26	3	8	11	11	14	34	10	19	23
T. A3	1897	26	3	54	3	22	46	20	89	48	2	23	48
D. A4	1855	66	8	56	9	11	44	11	92	77	1.7	57	47
T. A4	6868	68	9	52	41	52	41	48	92	120	1.7	57	47
D. A5	216	7	1	47	2	3	53	3	88	10	1.7	4	58
T. A5	1063	8	2	25	9	9	53	8	94	17	1.7	10	58
D. A6	1243	106	4	75	5	9	25	9	94	115	3.6	39	27
T. A6	3972	108	5	4.6	36	36	25	34	94	144	3.6	39	27
D. A7	843	29	9	43	9	13	57	11	92	42	1.8	20	65
T. A7	3771	30	40	30	40	40	57	37	92	70	1.8	46	65
D. Total	4955	231	25	60	41	41	40	41	92	278	2.2	66	43
T. Total	17561	240	28	41	159	159	40	147	92	399	2.2	175	43

TABLE 11. *Injury by the Codling Moth in the Orchard of W. A. Deering, Pittsfield, N. H., in 1908.*

Plot C. No Treatment.

Tree.	Total Apples*	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
C1	70	58	96.6	23	39.6	2	3.4	2	100	60	85.7	25	41.6
C2	102	43	100	21	48.8	0	0	0	0	43	42.1	21	48.8
C3	276	89	75.4	35	43.7	26	24.6	20	74.6	106	38.4	55	51.8
C4	925	235	60.1	116	49.2	156	39.9	145	92.9	391	42.2	251	64.1

Plot B. Treatment, Sprays 1, III. 2 lbs. arsenate of lead per barrel.													
C-5	306	113	62	53	47	54	38	51	94	167	54	101	62
C-6	398	180	76	92	51	57	24	24	70	237	59	220	93
C-7	542	255	78	101	40	71	22	67	94	326	60	168	51
C-8	690	160	65	74	46	85	35	69	84	245	35	143	58
<b>Total</b>	2309	1124	71	545	46	451	29	404	89	1575	47	919	35
B-1	1231	32	38	27	84	54	61	45	88	83	8	72	87
B-2	799	22	32	19	86	44	68	58	86	66	8	57	86
B-3	813	26	39	20	77	41	61	32	78	67	8	52	78
B-4	1098	13	41	12	92	19	59	17	89	32	3	29	91
B-5	697	13	43	11	85	17	57	17	100	50	4	28	93
B-6	999	10	37	5	50	17	63	16	94	27	3	21	78
B-7	582	11	33	9	82	22	67	21	95	33	6	30	91
B-8	424	31	49	18	86	22	51	22	100	43	10	40	93
B-9	609	18	49	18	100	19	59	19	100	37	6	37	100
B-10	626	25	36	20	80	45	64	43	95	70	11	63	90
<b>Total</b>	7888	191	39	159	83	297	61	270	91	488	6	429	89

\* Dropped and picked.

TABLE 11.—Continued.

Plot 1. Treatment, Spray I, mist. 2 lbs. arsenate of lead per barrel.

Tree.	Total Apples.	FIRST BROOD			SECOND BROOD			TOTAL		
		Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy
1-1	207	26	67	23	13	33	9	39	19	32
1-2	21	5	83	5	1	16	1	6	28	6
1-3	405	34	62	19	21	38	18	55	13	37
1-4	794	118	80	74	30	20	24	148	19	98
1-5	930	40	56	38	31	44	31	71	8	69
1-6	300	16	80	15	4	20	4	20	7	19
Total	2657	239	70	174	97	29	87	359	13	261

Plot 1A. Treatment. Same as Plot 1 but sprayed with atomizer.

A-1	419	31	52	29	28	47	25	59	14	54
A-2	907	22	61	21	14	39	13	36	4	34
A-3	271	21	72	18	8	28	6	29	11	24
A-4	1032	33	43	28	44	57	42	77	7	70
Total	2629	107	53	96	94	47	86	201	8	182

Plot 2. Treatment, Spray I, drenched. 2 lbs. arsenate of lead per barrel.

2-1	167	10	67	10	100	5	33	0	0	15	9	10	67
2-2	814	20	46	19	95	23	53	23	100	43	5	42	95
2-3	528	13	30	2	92	30	70	29	97	43	8	41	95
2-4	110	34	100	30	88	0	0	0	0	34	3	30	88
2-5	244	14	32	13	93	29	67	28	96	43	18	41	95
2-6	297	13	54	12	92	11	46	11	100	24	8	23	96
<b>Total</b>	2160	106	52	96	90	98	48	96	98	202	9	192	95

Plot 3A. Treatment, Spray III. 2 lbs. arsenate of lead. Apples bagged during spraying.

3-1	69	24	86	9	37	4	14	3	75	28	40	12	43
3-2	81	39	75	21	54	13	25	12	92	52	64	33	63
3-3	53	23	79	12	52	6	21	5	83	29	55	17	59
3-4	230	75	77	43	59	22	23	20	91	97	42	63	65
3-5	245	28	78	19	68	8	22	8	42	36	15	27	75
<b>Total</b>	668	189	78	104	55	53	22	48	90	242	36	152	63

\* Dropped and picked.



TABLE 11.—*Concluded.*

Plot 3. Treatment, Spray III. 2 lbs. arsenate of lead per barrel.

FIRST BROOD				SECOND BROOD				TOTAL					
Tree.	Total Apples*	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
3-6	746	33	49	22	67	34	51	32	94	67	9	54	80
3-7	260	21	70	10	48	9	30	9	100	30	11	19	63
3-8	128	11	55	9	82	9	45	9	100	20	16	18	90
3-9	278	21	60	14	67	14	40	14	100	35	12	28	80
3-10	678	49	63	32	65	29	37	28	96	78	11	60	77
3-11	425	26	45	15	58	32	55	24	75	58	14	39	57
3-12	730	53	76	42	79	17	24	15	88	70	9	57	81
Total	3235	214	60	144	67	144	40	131	91	358	11	275	77
Plot 4. Treatment, Spray I, III. Arsenate of lead 2 lbs. per barrel.													
4-1	646	6	27	5	83	16	73	15	94	22	3	20	91
4-2	401	32	63	26	81	19	37	18	95	51	13	44	86
4-3	510	45	55	39	87	36	44	36	100	81	16	75	92
4-4	312	20	49	17	85	21	51	20	95	41	13	37	90
4-5	505	16	42	13	81	22	58	22	100	38	7	35	92
4-6	297	25	64	20	80	14	36	13	93	39	13	33	85
Total	2671	144	53	122	84	123	47	124	97	272	10	246	90

TABLE 12. *Injury by Codling Moth in the Orchard of Gilman Woodman, Durham, N. H. in 1908.*

Tree.	Total Apples*	FIRST BROOD						SECOND BROOD						TOTAL	
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.		
		Wormy	cent.	Wormy	cent.	Wormy	cent.	Wormy	cent.	Wormy	cent.	Wormy	cent.	Wormy	cent.
C-1	564	257	56	99	38	198	44	164	82	81	263	57			
C-2	102	44	100	20	45	0	0	0	0	43	20	45			
C-4	863	391	49	141	36	399	51	323	81	790	91	464	59		
C-5	3779	2032	68	359	13	961	32	520	54	3000	79	879	29		
C-A	1200	260	49	102	39	271	51	136	50	531	44	238	45		
C-B	1305	420	56	170	40	327	44	175	53	747	57	345	46		
Total	7813	3704	64	891	24	2173	36	1318	61	5877	75	2209	37		
Plot B. Treatment, Sprays I, III, 2 lbs. arsenate of lead per barrel.															
B-1	6299	55	7	32	58	730	93	505	69	785	12	537	69		
B-2	4218	25	6	16	64	399	94	283	71	424	10	299	70		
B-3	2300	58	34	49	84	112	66	60	53	170	7	109	64		
Total	12817	138	10	97	70	1241	90	748	60	1379	11	845	61		
Plot 2. Treatment, Spray I with atomizer. 2 lbs. arsenate of lead.															
2-7	3009	56	11	22	39	464	89	254	55	510	17	276	54		
2-8	1763	31	10	14	45	268	89	174	66	299	17	188	63		
2-9	692	20	23	14	70	68	77	40	59	88	13	54	61		
Total	5464	107	13	50	47	790	88	468	59	397	16	518	58		

\* Dropped and picked.

TABLE 12.—*Concluded.*

## Plot 3. Treatment, Spray I, drenched. 2 lbs. arsenate of lead.

Tree.	Total Apples*	FIRST BROOD			SECOND BROOD			TOTAL			
		Total Wormy	Per cent.	Side Wormy cent.	Total Wormy cent.	Per cent.	Side Wormy cent.	Total Wormy	Per cent.	Side Wormy cent.	
3-10	3452	13	25	4	31	39	75	52	1.5	42	81
3-12	2331	1	1.6	1	100	59	98	60	2.5	58	97
3-13	1967	5	8	5	100	59	92	64	3.2	60	94
3-14	1402	3	6	3	100	45	94	48	3.3	38	79
3-15	2327	8	10	6	75	71	90	79	3.3	66	83
Total	11482	30	10	19	63	273	90	303	2.6	264	87

## Plot 4. Treatment, Spray III. 2 lbs. arsenate of lead.

4-16	1080	29	10	17	59	249	90	63	25	278	16	79	25
4-17	552	21	18	23	74	141	82	47	33	172	31	70	41
4-18	1821	37	20	25	67	145	80	95	65	182	10	120	66
4-19	1171	21	15	12	57	117	85	48	41	138	12	60	43
4-20	811	37	25	24	65	104	75	55	53	141	17	79	56
Total	5435	155	17	101	65	756	83	307	41	913	17	408	48

Plot 1. Treatment, Spray I, mist. 2 lbs. arsenate of lead.

1-1	2989	25	11	16	64	197	89	162	82	222	7	178	80
1-2	2675	9	8	7	78	96	92	86	89	107	4	93	87
1-3	2701	14	11	10	71	144	89	113	78	126	6	123	98
1-4	2738	6	4	6	100	126	95	111	88	132	5	117	89
1-5	431	5	12	2	40	38	88	25	66	43	10	27	63
1-6	2837	20	11	18	90	168	89	121	73	188	6	139	74
Total	14291	79	10	59	75	769	90	618	80	816	6	677	83

TABLE 13. Injury by the Codling Moth in the Orchard of Albert DeMerritt, Durham, N. H. in 1908.  
Plot C. No Treatment.

Tree.	FIRST BROOD			SECOND BROOD			TOTAL						
	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy	Total Wormy	Per cent.	Side Wormy				
C1	1044	552	75	219	40	183	25	148	81	735	70	367	50
C2	433	209	75	91	43	70	25	60	86	279	64	151	54
C3	557	98	47	52	53	109	53	76	70	207	37	128	61
C4	382	57	33	33	58	81	67	43	51	141	37	76	54
C5	1020	93	24	49	53	288	76	161	56	381	37	210	55
C6	135	46	73	23	50	17	27	13	76	63	46	36	57
Total	3552	1055	58	467	45	751	42	501	67	1806	51	968	54

\* Dropped and picked.

TABLE 13.—*Concluded.*  
 Plot B. Treatment, Sprays I, III. 2 lbs. arsenate of lead per barrel.

Tree.	Total Apples*	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
B1	1729	41	58	7	17	30	42	20	67	71	5	27	38
B2	1369	23	47	11	43	26	53	14	54	49	3.5	25	61
B3	900	15	33	3	20	31	67	24	77	46	5	27	59
B4	745	25	37	8	32	42	63	28	67	67	9	36	54
B5	680	27	47	7	26	30	52	18	60	57	8	25	44
<b>Total</b>	5423	131	62	36	27	155	38	104	87	290	5.3	140	48

Plot 1. Treatment. Same as Plot B.

1—1	1280	20	27	15	75	53	73	39	73	73	5.7	54	74
1—2	1330	134	74	57	42	46	26	36	78	180	14	93	68
1—3	239	22	76	10	45	8	24	7	100	29	12	17	59
1—4	320	17	63	9	53	10	37	9	90	27	8.4	18	67
1—5	156	8	61	5	62	5	39	4	80	13	8.3	9	69
<b>Total</b>	3325	201	62	96	48	121	38	95	78	322	9.6	191	59

Plot 2. Treatment, Spray II. 2 lbs. arsenate of lead per barrel.

2-1	457	13	36	4	31	23	64	11	48	36	7.8	15	42
2-2	176	20	46	10	50	23	53	13	56	43	24	23	53
2-3	137	18	67	11	61	9	33	6	67	27	20	17	63
2-4	780	61	49	29	47	63	51	32	51	125	16	61	49
2-5	515	27	52	16	59	25	48	13	52	52	10	29	56
Total	2065	139	49	70	54	143	51	75	52	282	18.7	145	51

Plot 3. Treatment, Spray III. 2 lbs. arsenate of lead per barrel.

3-1	681	85	53	41	48	75	47	37	49	160	11	78	49
3-2	356	21	52	17	81	28	48	14	50	59	7.8	31	52
3-3	420	17	24	5	29	53	76	32	60	70	13	37	53
3-4	580	56	53	27	48	49	47	27	55	105	8.4	54	51
3-5	412	12	20	2	17	47	80	24	51	59	11	26	44
3-6	800	29	29	18	62	72	71	46	64	101	9	64	63
Total	3249	230	41	110	47	324	59	180	55	554	17	290	52

\* Dropped and picked.



TABLE 14. *Injury by the Codling Moth in the Packer's Falls Orchard, Durham, N. H. in 1908.*

Plot C. No Treatment.

Tree.	Total Apples	FIRST BROOD				SECOND BROOD				TOTAL			
		Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.	Total Wormy	Per cent.	Side Wormy	Per cent.
C-1	107	60	57	41	68	9	13	1	11	69	64	42	61
C-2	111	25	69	17	68	11	31	2	18	36	32	19	53
C-3	98	32	69	17	53	14	30	2	14	46	47	19	41
C-4	35	12	63	9	75	7	37	2	28	19	53	11	58
C-5	113	59	70	31	52	25	30	7	28	84	74	38	45
Total	465	188	74	115	61	66	26	14	25	254	55	129	51

Plot J. Treatment, Spray J, drenched. 2 lbs. arsenate of lead.

1-1	336	12	57	8	67	9	43	0	0	21	6	8	38
1-2	287	25	48	12	48	27	52	3	11	52	18	15	29
1-3	274	22	69	14	63	10	31	1	10	32	12	15	47
1-4	179	10	43	7	70	13	57	2	15	23	13	9	39
1-5	348	25	64	18	72	14	36	0	0	39	11	18	46
Total	1415	94	56	59	68	73	44	6	8.2	167	12	65	39

Plot 2. Treatment, Spray I, mist. 2 lbs. arsenate of lead per barrel.

2-1	104	13	48	12	92	14	52	60	71	27	23	22	82
2-2	117	11	46	9	82	13	54	8	61	24	20	17	71
2-3	136	10	37	10	100	17	63	0	0	27	20	10	37
2-4	99	7	39	5	74	11	61	3	27	14	18	8	44
2-5	57	2	14	1	50	12	86	3	25	14	24	4	28
Total	502	43	39	37	86	67	61	24	36	110	22	61	55

Plot 3. Treatment, Spray I, 2 lbs. arsenate of lead and Spray III, 10 lbs. per barrel.

3-1	97	0	0	0	0	6	100	0	0	6	6.1	0	0
3-2	56	3	60	3	100	2	40	0	0	5	9	3	60
3-3	204	15	60	14	73	10	40	0	0	25	12	11	44
3-4	205	18	43	12	67	21	54	2	9.5	39	19	14	36
3-5	186	17	63	12	70	10	38	2	20	27	14	14	52
Total	748	53	32	38	72	49	48	4	49	102	14	42	41

Plot 4. Treatment, Sprays I, III and V, 2 lbs. arsenate of lead.

4-1	221	17	46	13	76	20	54	3	45	37	11	16	43
4-2	122	11	73	8	73	4	27	1	25	15	12	9	60
4-3	106	16	53	11	69	14	47	1	7	30	28	12	40
4-4	203	14	54	9	64	12	46	1	8	26	13	10	38
4-5	407	33	48	18	54	35	51	5	14	68	17	23	34
Total	1159	91	52	61	67	85	48	11	13	176	15	72	41

Table 18 brings out the effect of the spraying in 1906 and 1907 on the amount of fruit which dropped and the worminess of the picked fruit.

In 1908 the apples injured by the first brood were picked off, so that no correct figures of the relation of dropped to picked fruit can be given. Experience has shown, however, that an almost negligible per cent. of the picked fruit is injured by the first brood of larvae, practically all being due to the second brood.

In 1908 all plots in the four orchards averaged 11 per cent. wormy for the entire season. 33 per cent. of this worminess was due to the second brood, so that not over 3.2-3 per cent. of the total crop could have been wormy picked fruit and an average of not over 5 per cent., and, on some plots only 2 or 3 per cent. of the picked fruit could be wormy.

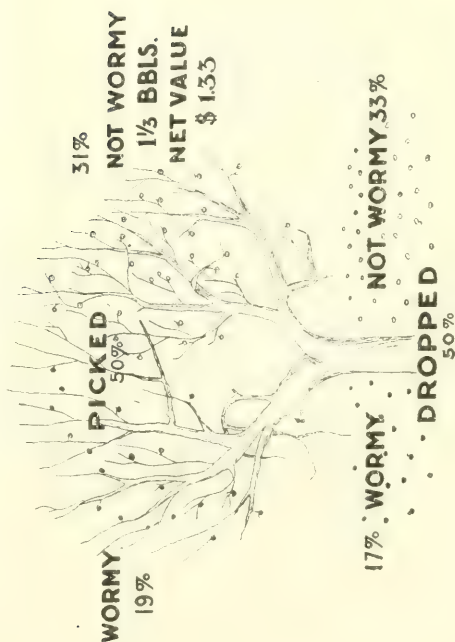
A study of the figures shows that in most cases the value of the most efficient sprays was due to their reducing the amount of wormy windfalls, or, in other words, preventing worminess so that the fruit remained on the tree. On the unsprayed trees an average of 26 per cent. of the total fruit dropped as wormy, and 15.7 per cent. was wormy when picked.

In the four orchards sprayed in 1908, considering only the fruit which actually did drop and not including the wormy fruit picked from the trees—which would not materially affect the figures, 28 per cent. of the total fruit was wormy drops on the unsprayed trees and 5 per cent. on the sprayed trees.

An average of all the sprayed plots in table 18, shows that of the total crop of fruit on any tree, 4.7 per cent. drops as wormy and 4.1 per cent. is wormy picked. Thus, the averages for 1906 and 1907 compare very closely with those for 1908 with diverse conditions.

Subtracting the percentage which drops plus the percentage which is wormy when picked, from 100. gives the percentage of the total crop which is picked free from worms, which is the essential matter for the fruit grower. On the unsprayed plots the picked fruit free from worms is found to average only 43 per cent. of the total crop, while on all the sprayed plots it averages 70 per cent., a difference of 27 per cent. of the total crop. Thus a gain of about one-fourth of the crop seems to be a fair average of the actual benefit to be derived from spraying, if we base our estimates upon the total fruit borne by the tree. This would mean that on a sprayed tree which picked three bar-

## NOT SPRAYED



## SPRAYED

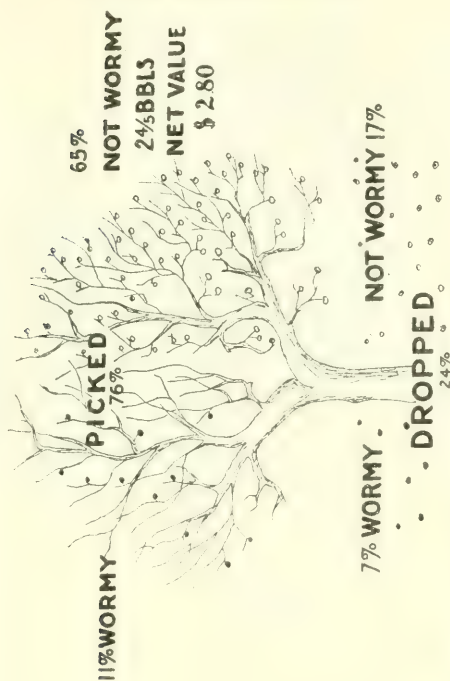
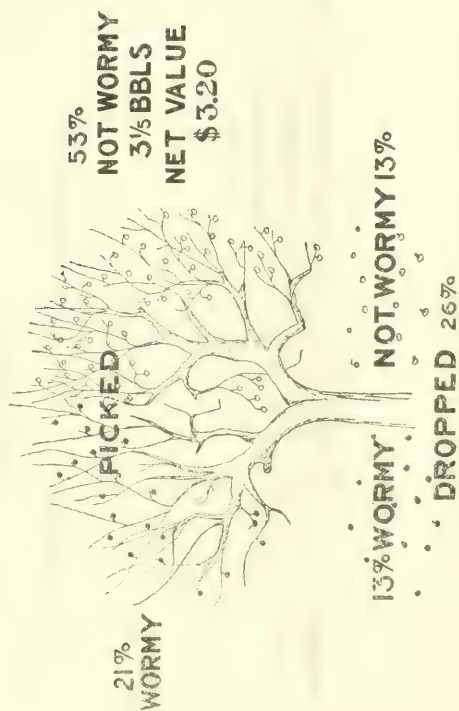


FIG. 25.—Result of spraying at Walpole, N. H., in 1906.

## NOT SPRAYED



## SPRAYED

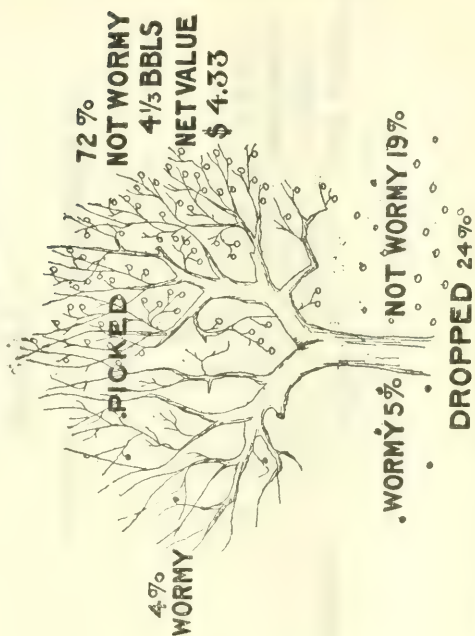


FIG. 36.—Result of spraying at Hancock, N. H., in 1906.

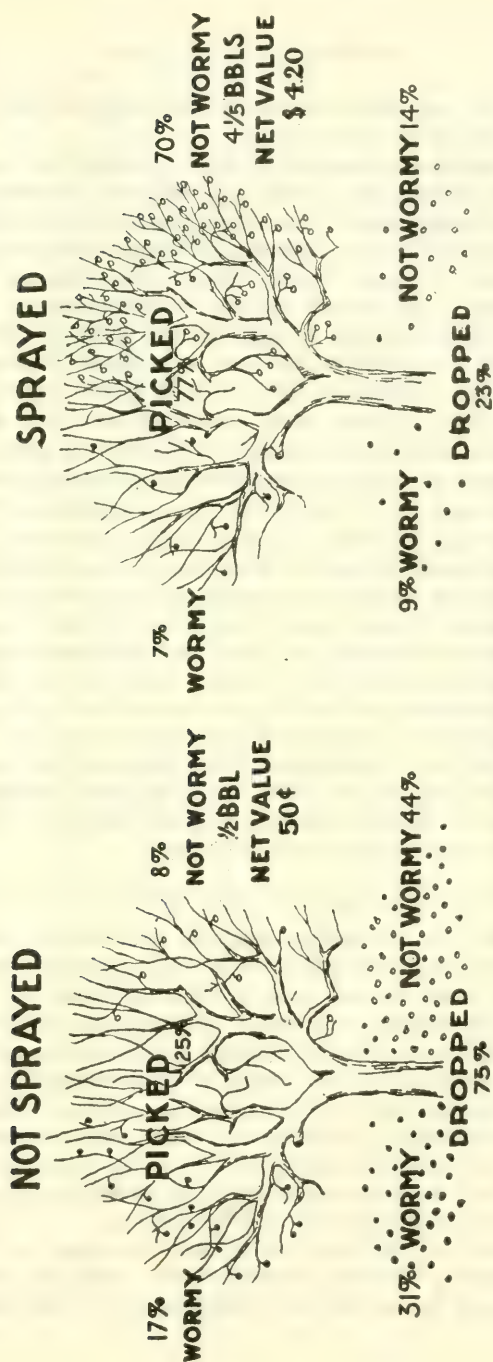


FIG. 37.—Result of spraying at Greenland, N. H., in 1906.



rels of fruit, one barrel of perfect fruit worth \$1 to \$1.25 net, had been gained by the spraying.

If the difference in amount of perfect picked fruit was based on the picked fruit only, leaving the drops out of consideration, the benefit would appear to be only about three-fourths of that shown above, but only by taking the dropped fruit into account can a correct estimate of the value of the spraying be made. When there is an unusual amount of worminess and the best spraying, the benefit due to spraying will often amount to half of the total fruit borne by the tree, as is shown by some of the plots in table 18, which in the case of a tree with the same amount of fruit as cited above, would amount to 2 barrels instead of one out of three picked being saved by spraying. But under average New Hampshire conditions it seems a fair estimate that about one-fourth of the total fruit, or one-third of the fruit actually picked is saved as perfect fruit, by spraying. This is shown graphically in Fig. 38. Such a statement of the benefit derived from spraying is not as striking as to say that but one apple in one hundred of those picked was wormy, but the former statement more clearly states the facts, and only one in a hundred of the picked apples may be wormy and yet the real benefit from the spraying not be as great as on other trees where a larger proportion of the picked fruit was wormy, but on which the spraying had prevented a large drop and thus secured a much larger crop to pick. The old saying that "nothing will lie like statistics," is well exemplified in considering the benefits of spraying as often recorded and compared.

#### THE CARE OF THE ORCHARD IN RELATION TO CODLING MOTH CONTROL.

The injury by the codling moth in the neglected orchard is always noticeably more severe than in one which has been given reasonably good care as regards the destruction of windfalls, pruning and scraping the trees. Although this is a matter of general observation, in 1906 we made definite records at Durham. mine the difference in the injury in two orchards at Durham. One of these had been given practically no care for several years, and its condition is shown by the fallen limbs and the ground covered with apples as shown in Figure 39, while in the other the trees had been scraped every year, hogs had been pastured, and the remaining drops had been picked up.

The record of the neglected orchard is shown in Table 19, which does not, however, include all the drops, as the dropped fruit was not picked up until September 15. If the entire drop

## NOT SPRAYED

## SPRAYED

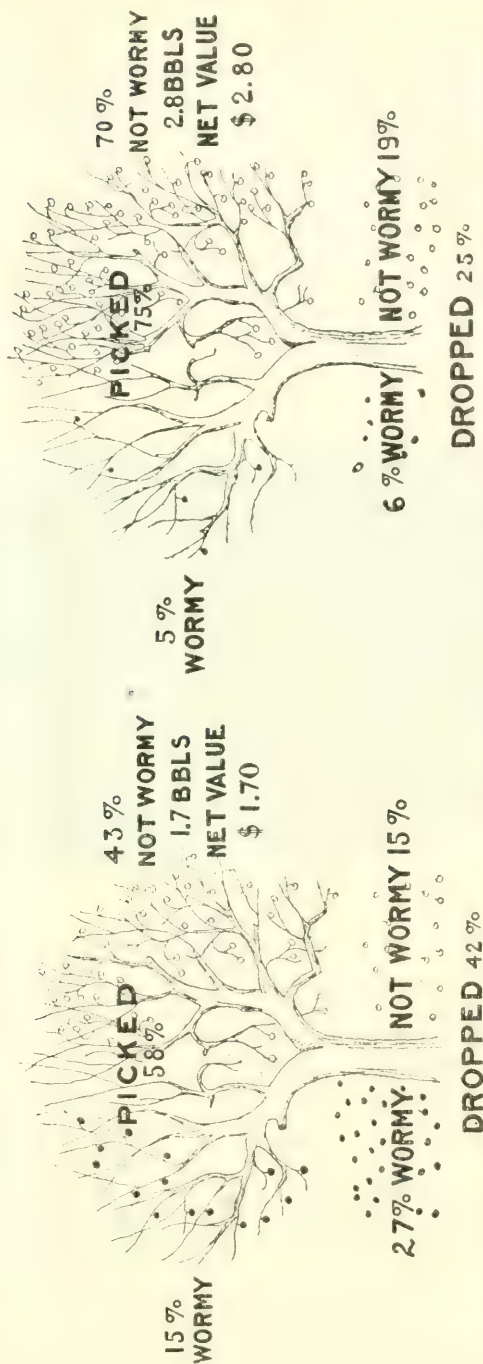


FIG. 38. Average results of spraying in nine New Hampshire orchards in 1906, 1907, and 1908, showing the proportion of fruit which drops and is picked and the proportion which is wormy and free from worms on sprayed and unsprayed trees. The profit shown is based on a crop of three barrels picked fruit on the sprayed trees.

had been secured it would, undoubtedly, have formed 50 per cent. of the total crop. The orchard which was cared for as described, is given in Tables 15 and 18 as the check plot of DeMeritt's orchard.

Considering 50 per cent. of the crop as dropping in the uncared-for orchard instead of 43 per cent. as given in Table 19, we find the following differences. In the neglected orchard three-fourths of the windfalls were wormy, while in the other only slightly over one-fourth (27 per cent.) dropped, and but half of it was wormy. Of the picked fruit one-sixth was wormy in the neglected orchard, while only one-ninth was wormy in



FIG. 39.—The ground covered with the droppings of the whole summer in the neglected orchard.

the other, but the wormy picked fruit formed 8 per cent. of the total crop of the tree in both cases. In the neglected orchard 42 per cent. of the total crop was picked free from worms, making two barrels worth \$2 net, while in the orchard cared for, 65 per cent. of the fruit was picked free from worms, making 3 1-4 barrels, worth \$3.25 net, and showing a benefit of \$1.25 per tree at but slight cost for scraping the trees and picking up the drops, which pay for themselves in cider. Altogether there were but about one-half as many wormy apples during the whole season in the orchard cared for (21 per cent.), as in the neglected orchard (40 per cent.). This is shown graphically in Fig. 40.



Table 15. Summary of Spraying Experiments Against Codling Moth at Durham in 1906

		FIRST BROOD.																SECOND BROOD.																			
Plot.	Treatment.	No. of Trees.	No. Apples per Tree.	TOTAL.												ENTERED CALYX.				ENTERED SIDE.				TOTAL.								ENTERED CALYX.					
				Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	September Drops. Per cent. of Total Wormy.	Per cent. of First Brood.		Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Per cent. of First Brood.		Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Direct Benefit.				Per cent. of Second Brood.		Per cent. of Total Fruit.		Per cent. of Total Wormy.				
				Per cent. Benefit.	Per cent. Wormy.				Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.	Per cent. Wormy.			Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.	Per cent. Wormy.			Per cent. Benefit.	Per cent. Wormy.			Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.	Per cent. Wormy.		Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.	Per cent. Wormy.
A. DeMerit's.				6	2345	6.7	32.7 <sup>2</sup>	24.3 <sup>5</sup>	77.1	5.1	35.7	23.2	7.7 <sup>2</sup>	11.3 <sup>4</sup>	53.4	78.5 <sup>3</sup>	8.8	41.6																			
C	None	5	3195	5.3	20	35.2	6.4	24.	65.4	15	3.5	31	22.8	7.7	34.6	1.8	36	39.4	19.	16	20	8.4	77.4	1	5.57	37	30.3										
51-55	.....II, 1 lb. A. L.+Bx.	5	2922	5.5	17	27.	5.5	14	51.	33	2.8	45	13.7	11.2	49.	2.7	1	59.	.5				70.	10	7.7	12	41.3										
41-45	.....II, II, 2 lb. A. L.+Bx.	5	2766	3.2	52	25.	16.9	16.	69.	22	1.9	62	15.	15.5	40.	1.2	25	10.	1.9				61.	21	4.3	51	35.9										
46-50	.....I, III, 1 lb. A. L.+Bx.	5	2542	3.4	49	22.	15.9	40.	58.	24	1.9	62	12.7	15.5	42.	1.5	6	9.3	.46				60.	22	5.9	33	40.8										
16-20	.....II, II, V, 1 lb. A. L.+Bx.	5	1793	6.4	5	35.	1.6	20	58.	24	3.7	27	20.3	6.7	42.	2.7		14.7					72.	8	5.6	37	32.4										
26-30	.....I, II, K. L. B. P. ½ lb.	5	2682	3.8	43	31.	14.	15.	57.	26	2.1	59	17.6	14.7	43.	1.7		13.4					68.	13	4.4	50	36.7										
21-25	.....II, III, K. L. B. P. ½ lb.	5	1563	4.2	37	36.	12.1	15.	57.	26	2.4	53	20.5	13.2	43.	1.8		15.5					62.	33	2.7	69	25.4										
31-35	.....I, II, P. G. ½ lb.+Bx.	5	2476	3.3	51	26.	16.6	9.	69.	10	2.27	55	17.9	13.7	31.	1.03	35	8.1	2.7				63.	19	5.1	42	40.9										
36-40	.....II, II, P. G. ½ lb.+Bx.	5	2345	2.5	62	22	20.2	12.	60.	22	1.5	70	13.2	17.5	40.	1.	37	8.8	2.8				70.	10	5.1	42	46.2										
Arthur Ladd's.																																					
C	None	8	441	13.5		70.			65.1		8.5		45.5		34.9		5.		24.5				24.6		1.4		7.3										
A	.....I, II, 2 lb. A. L.+Lemox Bx.	5	1394	2.2		67.			42.5	35	1.1		32.5		57.5		1.1		24.5				33.		.62		3.3										
B	.....I, II, 2 lb. A. L.+Leggett's Dry Bx.	4	1129	1.1		57.3			37.9	40	.52		21.7		62.1		.88		35.6				16.4		.12		7.										
C	.....I, II, 2 lb. A. L.+Lion Bx.	5	553	2.9		67.2			53.7	17	1.56		36.1		46.3		1.34		31.1				20.		.3		6.5										
D	.....I, II, 2 lb. A. L.+34 Bx.	5	653	1.9		73.			51.1	10	1.2		42.4		41.9		.79		30.6				4.4		.63		1.2										
E	.....I, II, Pyrox 5 lb.	6	1662	1.3		49.8			31.5	52	.51		15.7		68.5		.79		34.1				10.		.1		5.1										
F	.....I, II+24 Bx.	6	2165	1.4		47.6			29.2	53	.41		13.9		70.8		.99		33.7				11.5		.2		5.8										
Average	.....I, II, 2 lb. A. L.+Bx.	51	1351	1.85	86	66.1	61.6		48.	26	.88	90	31.7	40.9	52		.97	80	34.4				22.7	8	13	90	7.7										
J. Smith's.																																					
H	None	5	515	10.6		89.9			75.		8.		67.4		25.		2.6		22.5				58.1		7.		5.9										
16	.....I, 2 lb. A. L.+24 Bx.	6	1790	3.4		88.5			48.7	34	1.7		43.1		51.3		1.7		45.4				15.3		.04		1.76										
11	.....I, II, 2 lb. A. L.+43 Bx.	5	1355	3.1		69.3			47.7	35	1.5		48.5		52.3		1.6		20.8				20.9		.3		6.4										
Average		11	1572	3.3	69	79.	61.		48.2	34	1.6	80	39.	53.	51.8		1.7	34	40.	8.7			18.1	69	.17	75	3.8										

1. The per cent. of wormy calyx and per cent. of wormy side of first brood and figures based upon them, are the results of records of the August drops and picked fruit only. Through error the September drops were not recorded as to calyx or side worminess.

2. "Per cent. of total wormy," and figures based thereon, is the per cent. of the total number wormy for the whole season which are wormy by the first brood, secured by taking the drops collected Sept. 29 and the picked fruit wormy and adding to the August drops which were wormy, omitting the drops of Sept. 1 and 11 of which record as to first or second brood was not made.

3. The percentages of second brood wormy through calyx and through side are based on the picked fruit only; no records of these points having been made from the September drops.

1906 and at Deerfield in 1907.

## SECOND BROOD.

ENTERED CALYX.						ENTERED SIDE.								CALYX.				SIDE.				TOTAL.		
Per cent. of Total Wormy.		Benefit as "Total Per cent. Benefit."	Direct Benefit.			Per cent. of Second Brood.		Per cent. of Total Fruit.		Per cent. of Total Wormy.	Direct Effect.			Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Per cent. Wormy.	Per cent. Benefit.	
			Per cent. Benefit.	Per cent. of Possible Benefit.	Benefit as "Total Per cent. Benefit."	Per cent. Benefit.	Per cent.	Per cent. of Total Fruit.	Per cent. of Possible Benefit.		Benefit as "Total Per cent. Benefit."	Per cent. Benefit.	Per cent.	Per cent. of Total Fruit.	Per cent. Benefit.									
41.6						21.53		2.5		11.4				17.1		80.		4.		20.		21.2		
30.3	15.3		17	21	8.7	22.6		1.6	36	9.1	4.1	16	20	2.2	14.4	10	80.	12.8	3.7	7.	30.	1.4	18.1	14.
41.3	4.9					30.		3.5		17.7					14.	18	75.	14.4	4.7		25.		18.7	11
35.9	21.2					39.		2.8		23.1					9.	47	74.	37.6	3.1	22.	26.	4.4	12.1	43.
40.8	13.7					40.		4.		27.2					10.	41	69.	32.8	4.6		31.		14.5	31.
32.4	15.3	32	33	13.3	28.			2.2	12	12.6	1.4	7	7	7	13.1	23	72.	18.4	5.		28.		18.1	14.
36.7	20.5	7	12	2.8	32.			2.2	12	17.3	1.4				8.3	51	65.	40.8	4.3		35.		12.6	41.
25.4	28.7	32	50	13.3	48.			2.6		23.6					7.4	57	69.	45.6	3.	25.	31.	5.	10.7	48.
40.0	17.4				37.			3.1		24.1					8.8	48	74.	38.4	3.	25.	26.	5.	11.8	44.
46.2	17.4				30.			2.3	8	19.8	.8				8.4	51	78.	40.8	2.3	42.	22.	8.1	10.7	49.
7.3					75.4			4.4		22.7					9.9		59.8		9.4		47.2		19.4	
3.3					90.2			.99		29.7					1.12		35.8		2.66		64.2		5.3	
7.					83.6			.88		35.7					.64		28.7		1.76		71.3		2.1	
6.5					80.			1.1		26.3					.67		42.6		.94		57.4		4.4	
1.2					95.6			.67		25.8					1.23		43.6		1.4		56.4		2.6	
5.1					90.			1.2		45.1					.61		20.8		1.99		79.2		2.6	
5.8					88.5			1.3		46.6					.61		19.7		2.29		80.3		2.9	
7.7	64.9	.1	.8	.7	87.3			1.62	77	26.2	18.8				.93	90	39.4	47.	1.57	83	60.6	40.	3.	84
5.9					41.9			.5		4.2					8.7		93.3		3.1		26.7		11.8	
1.76					84.7			.46		9.74					1.74		44.9		2.16		55.1		3.9	66
6.4					79.1			1.1		24.3					1.8		54.9		2.7		45.1		4.6	61
2.8	4.4				81.9			.78		17.2					1.77	79	42.8	57.	2.48	20	57.2	5.3	4.25	62



Table 16. Summary of Spraying Experiments Against the Codling Moth at Durham and

FIRST BROOD.																	SECOND BROOD.															
Plot.	Treatment.	No. Trees.	No. Apples per Tree.	TOTAL.				ENTERED CALYX.				ENTERED SIDE.				TOTAL.				ENTERED.												
				Per cent. of Total Fruit.		Benefit as "Total Bene- fit."	Per cent. of Total Broods.	Per cent. of First Brood.		Per cent. of Total Fruit.		Per cent. of Total Broods.	Benefit as "Total Bene- fit."	Per cent. of First Brood.		Per cent. of Total Fruit.		Per cent. of Total Broods.	Benefit as "Total Bene- fit."	Per cent. of Total Fruit.		Per cent. of Total Broods.	Benefit as "Total Bene- fit."	Direct Effect.		Per cent. of Second Brood.		Per cent. of Total Fruit.		Per cent. of Total Broods.		
				Per cent.	Benefit.			Per cent.	Benefit.	Per cent.	Benefit.			Per cent.	Benefit.	Per cent.	Benefit.			Per cent.	Benefit.			Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.		Per cent.	Benefit.
				Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.
C	G. Woodman's None	7	5151	6.6	29			71		4.7		20.			29		1.9		9			16.1		71				67		10.8		47.6
1	I. Mist, 2 lb. A. L.	5	3193	3.8	94	20	27.2	61	14	23	95	12.2	19.	70	39		15	92	7.8	8.2	1.5	90	80	63.9				24	68	4	96	18.5
2	I. Drench, 2 lb. A. L.	5	3897	3.8	88	35	25.5	73		5.84	87	25.5	17.4	66	27	6	216	88	9.5	7.7	1.6	90	65	63.9	2	16	1.4	15	77	21	98	9.7
442-443	I. Atomizer, 2 lb. A. L.	4	2660	2.7	59	32	17.1	95		1.95	58	23	11.6	64	28	3	75	60	9.	5.4	5.8	64	68	45.4	5	12	3.5	49	26	2.9	73	33.3
5	II, 2 lb. A. L.	5	2764	6.	9	34	2.6	92		4.38	6	24.8	1.2	42	27	6	1.62	15	9.2	1.35	11.	31	66	22.	22	24	1.5	53	20	5.83	46	34.9
6	III, 2 lb. A. L.	5	3293	4.9	25	41	7.2	52		3.7	21	30.7	4.2	30	25	13	1.2	36	10.3	3.2	7.	56	59	39.7	31	41	22.	55	18	3.9	64	32.4
439-441	III, above 2 lb. A. L.	3	5175	1.9	71	47	20.5	86		1.35	71	33.3	14.2	50	29		55	71	13.7	6.3	2.1	87	53	61.7	16	22	11.3	70		1.5	86	37.1
446-449	III, above & below 2 lb. A. L.	2	4094	3.	54	71	15.6	66		2.58	4.5	61.	9.	38	14	51	42	7.8	10.	7.	1.2	92	23	65.3	38	57	27.	51	23	.62	94	14.7
437-438	III, Soap+2 lb. A. L.	2	4053	1.9	71	61	20.5	81		1.3	72	41.4	14.4	57	32		16	68	19.6	6.1	.86	94	39	66.7	23	79	16.3	67		.58	95	26.1
448	III, Bagged, 2 lb. A. L.	1	3924	6.3	19	49	5.5	56		4.2	10	38.7	2.	13	21	27	1.1	42	10.3	3.7	5.4	66	51	46.8	47	58	33.3	59	12	3.2	70	39.
3	I, II, 2 lb. A. L.	3	2536	3.49	92	20	26.6	100		2.8	94	17.1	18.8	70	43		21	89	12.9	8.	1.1	90	70	63.9	-2			12	82	.14	98	8.4
A	I, III, V, 2 lb. A. L.	5	3572	1.3	80	60	23.2	88		1.16	75	53.4	15	57	11	62	14	92	6.6	8.2	9	94	40	66.7	14	70	9.9	8	88	.1	99	3.2
B	I, II, III, 2 lb. A. L.	8	5181	3.	95	43	27.5	99		2.3	95	32.2	19.	68	25	13	97	96	10.8	8.6	.5	96	57	68.1	1	20	.7	6	91	.03	99	3.4
C	W. A. Deering's None	5	1808	10.		48		67		6.7		32.		33		3.3		16.			11.		52					22		2.5		11.4
A	I, II, III, Bx. only.	3	1822	10.		57		73		7.3		41.6		27		18	2.7	18		2.8	.7	36	43	18.7				39		2.1	16	12.3
1	I, II, Mist, A. L.+ Bx.	5	1929	1.5	85	69	40.8	89		1.34	80		25.6		11	66	16	95		15.2	7	94	31	48.8				19	13	.17	94	5.8
2	I, II, Drench, A. L.+ Bx.	8	594	.9	91	45	43.6	77		.7	89		28.4		23	30	2	93		14.8	1.1	90	55	46.8				7	67	1.1	96	3.8
24 B	I, II, III, A. L.+ Bx.	7	823	.89	91	63	43.6	62		.55	90		28.8		38		34	89		14.2	.5	95	37	49.6				4	81	.12	95	1.4
13	I, II, III, A. L. 2 lbs.	5	1165	.5	95	56	45.6	69		.35	94		30		31	6	15	95		15.2	.4	96	44	50.1				23		.1	96	10.1
N. Row 14	15 I, II, III, A. L. 2 lbs.	2	1005	3.1	69	47	33.1	79		2.3	65		20.8		27	18	.8	75		12.	3.7	66	53	34.3				17	22	.7	72	9.
8, 9, 10, 11, 12 I, II, A. L.+ Bx.		35	598	1.5	85	51	40.8	58		13	87	87	27.8		42		63	80		12.8	1.3	88	49	45.7				10	54	.2	92	4.3
11, 15	V, 2 lbs. A. L.	8	725	3.3	67	39	32.2	47		30	1.7	74	23.6		53		1.6	51		8.16	6.7	39	70	30.2				26		2.	20	18.
6, 7	I, II, P. G. 58-64 Cu Pops.	9	1984	.76	92	41	44.1	78		.6	89		28.4		22	14	.16	95		15.2	1.04	90	59	46.8				7	68	.08	96	4.1
4, 5	I, II, III, P. G. 5 lb.+ Bx.	12	1173	1.	90	37	43.2	72		.72	89		28.4		28	23	.28	91		14.6	1.7	84	63	43.6				15	31	.3	88	9.4

# Durham and Pittsfield in 1907.

## SECOND BROOD.

ENTERED CALYX.							ENTERED SIDE.										CALYX.			SIDE.				TOTAL.	
Per cent. Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Benefit."	Direct Benefit.		Per cent. of Second Brood.		Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Benefit."	Direct Effect.			Per cent. of Total Fruit.	Per cent. of Total Wormy.	Benefit as "Total Benefit."	Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Benefit."	Per cent. Wormy.	Per cent. Benefit.		
Per cent.	Benefit.			Per cent. Benefit.	Per cent. of Possible Benefit.	Per cent. Benefit.	Per cent. Benefit.	Per cent. Benefit.	Per cent. of Possible Benefit.			Per cent. Benefit.	Per cent. Benefit.	Per cent. of Possible Benefit.				Per cent. Benefit.	Per cent. Benefit.					Per cent. Benefit.	Per cent. Benefit.
8		47.6				33		5.3		23.4					15.5		68		7.2		32		22.7		
4	96	18.5	45.0	2	33	.9		1.1	79	61.2	18.5	-15			.63	96	31	65.	1.25	82	69	26.	1.88	91	
21	98	9.7	46.6	10	83	4.7		1.36	74	55.6	17.3	-14			.82	94	48	63.9	1.57	79	52	25.2	2.4	89	
9	73	33.3	34.7	14	22	6.6		2.9	45	34.7	10.5	-14			4.85	68	54	47.	3.65	49	46	15.	8.5	62	
83	46	34.9	21.8	37	40	17.3		5.17	2	31.1	.4	-7			10.21	34	59	23.1	6.79	5	41	1.6	17	25	
9	64	32.4	30.4	29	49	18.3		3.1	41	26.6	9.6	+32	42	7.4	7.6	51	65	34.6	4.3	40	35	12.8	12.	47	
5	86	37.1	40.9	15	51	7.1	9	.6	89	15.9	20.8	+18	62	4.3	2.85	81	71	55.	1.15	84	29	26.8	4.	82	
62	94	14.7	44.7	40	87	18.2		.58	90	14.3	30.	+36	81	8.4	3.2	79	77	53.7	1.	86	23	27.5	4.2	81	
58	95	26.1	45.2	24	82	10.4		.28	94	12.9	21.9	+23	80	5.3	1.88	89	68	10.5	.88	87	32	27.7	2.8	87	
2	70	30.	33.3	51	62	24.2		2.2	58	21.	13.5	+39	48	6.6	7.4	52	69	35.	3.3	54	31	17.	10.7	52	
14	98	8.4	46.6	6	75	2.8		.96	81	61.6	18.9	-11			.42	97	25	65.9	1.17	84	75	26.8	1.6	93	
1	99	3.2	47.1	19	95	9.		.8	85	36.8	19.8	+5	25		1.26	91	56	61.8	.94	87	44	27.7	2.2	90	
63	99	3.4	47.1	4	80	1.8		.47	91	53.6	21.2	-4			.32	98	46	66.6	.51	92	60	29.4	.84	96	
5		11.4						8.5		40.6					9.2		44			11.8		56		21.	
1	16	12.9	1.8					4.9	42	30.1	16.9				9.4		55			7.6	34	45	19.	17.	19
17	94	5.8	10.7					.56	93	25.2	38.1				1.48	84	67	36.9	.72	93	33	53.1	2.2	90	
1	96	3.8	10.9					1.	88	51.2	35.9				.88	91	46	40.	1.2	90	60	50.	2.	90	
12	95	1.4	10.8					.38	95	35.6	38.8				.57	93	41	40.9	.83	93	59	52.1	1.4	93	
1	96	10.1	10.9					.3	94	33.9	39.5				.45	95	50	41.8	.45	96	50	53.2	.9	95	
7	72	9.	8.3					3.	64	44.	26.1				.3	96	44	42.2	3.8	67	56	26.8	6.8	69	
2	92	4.9	10.4					1.1	87	44.1	35.3				.98	89	35	39.1	1.82	84	65	46.9	2.8	86	
	20	18.	2.2					4.7	44	52.8	18.				3.2	65	32	28.6	6.8	43	68	23.4	10.	72	
88	96	4.1	10.9					.96	89	54.9	35.9				.72	92	46	40.4	1.08	91	60	50.6	1.8	91	
3	88	9.4	10.3					1.4	82	53.6	33.3				.89	90	33	39.6	1.81	84	67	46.4	2.7	86	

Table 17. Summary of Spraying Experiments Against the Codling

Plot.	Treatment.	No. Trees.	No. Apples per Tree.	FIRST BROOD.																SECOND BROOD.											
				TOTAL.			ENTERED CALYX.					ENTERED SIDE.					TOTAL.				ENTERED CALYX.				ENTERED SIDE.						
				Per cent. of Total Fruit.		Benefit as "Total per cent. Wormy."	Per cent. of First Brood.		Per cent. of Total Fruit.		Benefit as "Total per cent. Wormy."	Per cent. of First Brood.		Per cent. of Total Fruit.		Benefit as "Total per cent. Wormy."	Per cent. of Total Fruit.		Benefit as "Total per cent. Wormy."	Per cent. of Second Brood.		Per cent. of Total Fruit.		Benefit as "Total per cent. Wormy."	Per cent. of Second Brood.		Per cent. of Total Fruit.				
				Per cent.	Benefit.		Per cent.	Benefit.	Per cent.	Benefit.		Per cent.	Benefit.	Per cent.	Benefit.		Per cent.	Benefit.		Per cent.	Benefit.	Per cent.	Benefit.		Per cent.	Benefit.	Per cent.	Benefit.	Per cent.	Benefit.	Per cent.
C	G. Woodman's None.	6	1302	47.	64.		76.		11.	15.		24.		36.		48.		28.		36.		40.		9.		40.		3.9	56		
B	I, III, A. L. 2 lb.	3	4272	.1	98.	10.	62.7	30.	60	.3	97	3.	13.5	70.		7	98	7.	47.	9.7	65	90.	23.4		40.		3.9	56			
1	I, Mist, A. L. 2 lb.	6	2182	.5	99.1	9.	63.	25.	67	.1	99	2.	14.8	75.		.4	99	7.	47.5	5.2	81	91.	39.1		20.		50	90			
2	I, Atomizer, A. L. 2 lb.	3	1821	1.9	96.	12.	61.4	53.	30	1.	91	6.4	13.6	47.		.9	99	5.5	47.5	14.5	48	88.	17.2		41.		6.	33			
3	I, Drench, A. L. 2 lb.	5	2250	.2	99.6	10.	63.4	47.	38	.09	99	3.6	14.8	63.		.11	99	6.4	47.5	2.4	91	90.	32.7		10.		75	76			
4	III, 2 lb., A. L.	5	1355	2.8	94.	17.	60.1	35.	54	1.	91	6.	13.6	65.		1.8	95	11.	45.6	13.9	50	83.	18.		60.		8.3	7			
C	A. De Meritt's None.	6	592	30.		58.4		55.		17.	32.		45.		13.		26.		21.		41.6		33.3		7.						
B	I, III, A. L. 2 lb.	5	1084	2.4	92.	49.	53.7	73.		.5	97	37.	31.	27.	40	1.9	85	12.	22.	3.1	85	51.	35.		13.		61	1.2	82		
1	I, III, A. L. 2 lb.	5	680	6.2	86.	62.	50.2	53.6	2	3.3	78	33.	25.	46.4		2.9	77	29.	20.	3.8	82	38.	34.		30.		10	.9	87		
2	II, A. L. 2 lb.	5	413	6.7	84.	49.	47.	50.	9	2.8	83	24.2	26.5	50.		3.4	74	24.8	19.2	6.9	67	51.	27.8		48.		3.3	53			
3	III, A. L. 2 lb.	6	541	7.	77.	41.	44.8	53.	3	3.6	79	21.	25.2	47.		3.4	74	20.	19.2	10.	52	39.	21.0		45.		4.5	35			
C	W. Deering's None.	8	552 413	34.		71.		54.		19.		39.		46.		15.		32.		13.5		29.		11.		1.5					
B	I, III, A. L. 2 lb.	10	788	2.4	93.	39.	66.	17.	68	.4	97	7.	37.8	83.		2.0		32.		3.7	72	61.	20.8		9.		19	.3	80		
4	I, III, A. L. 2 lb.	6	412	5.4	87.	53.	61.7	16.	70	.9	95	9.	37.	84.		4.5	70	41.	22.	4.7	65	47.	18.8		4.		63	.2	86		
1	I, Mist, A. L. 2 lb.	5	539	9.	73.	70.	51.8	27.	50	2.5	86	19.	33.5	73.		6.5	56	51.	17.9	3.7	72	30.	20.8		10.		9	.4	73		
1 A	I, Atomizer, A. L. 2 lb.	4	655	4.	88.	53.	62.4	10.	81	.4	97	5.	37.8	90.		3.6	75	48.	24.	3.6	73	47.	21.1		9.		19	.4	73		
2	I, Drench, A. L. 2 lb.	5	425	4.9	85.	52.	60.3	10.	81	.5	97	5.	37.8	90.		4.4	70	47.	22.	4.4	67	48.	19.4		2.		81		100		
3 A	III, Bagged, A. L. 2 lb.	5	153	28.3	17.	58.	12.	45.	16	13.	31	36.	12.	55.		15.		43.		7.9	40	22.	11.6	23	27.	6.6	10.		9	.8	46
3	III, A. L. 2 lb.	7	462	6.6	80.	60.	56.8	33.	39	2.2	88	20.	34.	67.		4.4	70	40.	22.	4.4	67	40.	19.4		9.		19	.4	73		
C	Packer's Falls None.	5	93	40.4		74.		39.		16.		29.		61.		24.		45.		14.2		26.		79.		11.2					
1	I, Drench, A. L. 2 lb.	5	283	6.6	83.	56.	61.4	37.	5	2.5	84	22.	24.3	63.		4.1	82	34.	30.9	5.2	63	44.	16.3		92.		4.8	51			
2	I, Mist, A. L. 2 lb.	5	100	8.6	78.	39.	64.	17.	64	1.5	90	6.	26.	86.		7.1	70	33.	31.	13.3	6	61.	1.4		64.		19	8.5	31		
3	I, A. L. 2 lb.+III, 10 lb.	5	149	7.	82.	52.	60.	28.	23	2.	87	14.	25.2	72.		5.	79	38.	35.5	6.6	53	48.	13.7		81.			.6	94		
4	I, III, V, 2 lb. A. L.	5	292	7.8	80.	52.	59.2	33.	15	2.6	83	18.	24.	67.		5.2	78	34.	35.1	7.3	48	48.	12.4		87.			6.3	43		

# Codling Moth in 1908.

SECOND BROOD.															TOTAL.											
ENTERED CALYX.							ENTERED SIDE.								CALYX.					SIDE.					TOTAL.	
Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Direct Benefit.			Per cent. of Second Brood.		Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as Total Benefit.	Direct Effect.			Per cent. of Total Fruit.	Per cent. Benefit.	Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Per cent. of Total Fruit.		Per cent. of Total Wormy.	Benefit as "Total Per cent. Benefit."	Per cent. Wormy.	Per cent. Benefit.	
Per cent.	Per cent. Benefit.			Per cent. Benefit.	Per cent. of Possible Benefit.	Benefit as "Total Per cent. Benefit."	Per cent.	Per cent. Benefit.	Per cent.	Per cent. Benefit.			Per cent. Benefit.	Per cent. of Possible Benefit.	Benefit as "Total Per cent. Benefit."					Per cent.	Per cent. Benefit.					Per cent.
		73.					60.		17.		23.					47.		62		28.		38			75.	
9	56	36.	7.3	-41			60.		5.8	66	54.	15.	-32			4.1	91	39	56.4	6.6	76	61	28.8	10.7	85	
9	90	15.	11.	-9			80.		4.3	74	76.	27.	-25			1.	98	16	60.7	4.7	83	84	31.5	5.7	92	
	33	36.	4.2	-54			59.	1.6	8.5	50	52.	11.	-49			7.	85	43	52.7	9.4	66	57	25.	16.4	78	
1	76	9.	9.8	-23			90.		.3	98	81.	22.5	-1			.5	99	12	61.3	2.1	92	88	31.9	2.6	96	
3	7	50.	.9	-81			40.	33.	5.6	67	31.	15.4	-28			9.21	80	56	49.6	7.5	73	44	27.7	16.7	77	
		13.8					66.7		14.		27.8					23.6		47		27.2		53			50.8	
	82	15.	11.3	-15			87.		1.9	89	36.	34.7	4	26	1.1	2.	91	52	42.7	2.5	90	48	47.	5.5	89	
9	87	9.	11.9	9	40	1.2	70.		2.9	79	29.	21.9	2	9	.5	4.2	83	42	38.5	5.8	80	58	42.	10.	80	
3	53	25.	7.4	-30			52.	26.	3.6	74	26.	20.5	-1			6.7	71	49	33.3	7.	74	51	39.2	13.7	73	
5	35	26.	5.8	-44			53.	21.	5.5	00	33.	16.6	-14			8.1	63	48	30.5	8.9	67	52	35.5	17.	66	
5		4.					89.		12.		25.					19.5		42		28.		58			47.5	
3	80	5.	3.2				91.		3.4	71	55.	17.7				.7	96	13	40.3	5.4	80	87	40.4	1.6	87	
2	86	2.	3.4				96.		4.5	62	45.	15.5				1.9	90	10	37.8	9.2	67	90	38.8	10.1	78	
4	73	5.	2.9				90.		3.3	72	25.	18.				2.9	85	23	35.7	9.8	65	77	37.7	12.7	73	
4	73	4.	2.9				91.		3.2	73	43.	18.2				.7	96	9	40.3	6.9	75	91	43.5	7.6	84	
	100	1.	4.	19	98+	.7	98.		4.4	63	47.	15.7				.4	97	5	40.7	8.9	68	95	39.4	9.3	80	
8	46	2.	1.8				90.		7.1	40	29.	10.	40	40	10.	14.2	27	38	11.3	2.2	21	62	12.1	29.2	24	
4	73	4.	2.9				91.		4.	66	36.	18.5				2.5	87	24	36.5	8.5	69	76	36.	11.	76	
2		20.					21.		3.		6.					27.6		49		27.		51			54.6	
8	51	40.	11.4				8.		.4	86	4.	5.1	4	22		7.3	73	61	35.7	4.5	83	39	42.3	11.8	78	
5	31	46.	0.2				36.	61.	4.8		21.					10.	63	45	30.8	11.9	56	55	28.5	21.9	60	
0	94	44.	18.8	7	54	1.4	19.	9.	6.		4.					8.	71	59	34.7	5.6	79	41	40.2	13.6	75	
3	43	42.	8.6				13.	38.	1.	66	6.	3.9				8.9	67	60	32.8	6.2	80	40	40.8	51.1	72	



Table 18. Relative injury by the Codling Moth to dropped and picked apples.

In orchard of Wm. Weeks, Greenland, N. H. 1906.

Trees.	Treatment.	Sprays.	DROPPED FRUIT.						PICKED FRUIT.						TOTAL.	
			Average Number Apples.	Per cent. of Total.	Per cent. Benefit.	Per cent. Wormy.	Per cent. of Total Fruit Wormy Drops.	Per cent. Benefit.	Per cent. of Total.	Per cent. Wormy.	Per cent. of Total Fruit Wormy Picked.	Per cent. Benefit.	Per cent. of Total Fruit Perfect Picked.	Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.
C 3, 4, 5.....	None.....	.....	Av. 3456	75	.....	41	30.7	.....	25	70.	17.5	.....	7.5	.....	48.	.....
C 3.....	.....	.....	7000	84	.....	30	.....	.....	16	67.	10.7	.....	6.7	.....	34.	.....
C 4.....	.....	.....	1863	60	.....	78	.....	.....	40	73.	29.	.....	10.8	.....	76.	.....
C 5.....	.....	.....	1507	49	.....	80	.....	.....	51	73.	37.2	.....	14.	.....	77.	.....
16.....	1 lb. A. L.*.....	I, II.....	6852	26	.....	39	.....	.....	74	11.	.....	.....	62.	.....	18.	62
19.....	1 lb. A. L.....	I, II.....	2440	22	.....	58	.....	.....	78	12.	.....	.....	68.	.....	22.	54
23.....	1 lb. A. L.....	I, II.....	3497	21	.....	38	.....	.....	79	9.	.....	.....	71.	.....	15.	69
24.....	1 lb. A. L.....	I, II.....	3961	17	.....	30	.....	.....	83	4.3	.....	.....	79.	.....	8.9	81
Average.....	1 lb. A. L.....	I, II.....	4187	23	69	40	9.2	70	77	9.	6.9	60	70.	67	16.	66
5, 6, 7, 8.....	1 lb. A. L.....	I, II.....	.....	.....	.....	.....	.....	.....	.....	3.	.....	.....	.....	.....	.....	.....
9, 10, 11, 12.....	1 lb. A. L.....	I, II.....	.....	.....	.....	.....	.....	.....	.....	3.	.....	.....	.....	.....	.....	.....

In orchard of C. E. L. Hayward, Hancock, N. H. 1906.

C 1 to 5.....	None.....	.....	Av. 3648	26	.....	50	13.	.....	74	28.	20.5	.....	53.5	.....	34.	.....
6, 7, 8.....	* 1 lb. A. L.....	I, II.....	4478	18	30	37	6.6	65	82	7.	5.7	71	76.3	49	12.	64
9, 10.....	Home made A. L.....	I.....	3438	19	27	29	5.5	70	81	4.4	3.5	83	77.5	51	9.2	73
6 to 10.....	Home made A. L.....	I.....	3165	18	30	33	5.9	70	82	5.9	4.8	76	77.2	50	11.	67
22 to 25.....	Disparene.....	I, II.....	4189	24	8	20	4.8	67	76	5.6	4.2	81	71.8	39	9.3	72
17 to 20.....	* 1½ lb. A. L.....	I, II.....	3985	19	27	25	4.7	74	81	4.7	3.8	82	77.2	50	8.8	74
1 to 5, 11 to 16, and 21.....	* 1½ lb. A. L.....	I, II.....	3765	28	0	21	5.8	53	72	5.	3.6	85	68.4	32	9.6	71

\* All plots had 1 lb. first spray and 1½ lbs. second spray and 5.5 Bordeaux.

tA. L.—Arsenate of Lead.

P. G.—Paris Green.

Bx.—Bordeaux mixture.





Table 18. Relative injury by the Codling Moth to dropped and picked apples.—Continued.

In orchard of F. W. Hooper, Walpole, N. H. 1906.

Trees.	Treatment.	Sprays.	DROPPED FRUIT.						PICKED FRUIT.						TOTAL.	
			Average Number Apples.	Per cent. of Total.	Per cent. Benefit.	Per cent. Wormy.	Per cent. of Total Fruit Wormy Drops.	Per cent. Benefit.	Per cent. of Total.	Per cent. Wormy.	Per cent. of Total Fruit Wormy Picked.	Per cent. Benefit.	Per cent. of Total Fruit Perfect Picked.	Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.
Mackintosh Red.																
C 1, C 2	None		Av. 1867	46		59			54	11.	5.9		48.		33.	
1, 2, 3, 4.	1/4 lb. P. G. and Bx.	I, II.	3682	44	4	61			56	7.2	4.	32	52.	8	31.	6
Pewaukee.																
C 3, 4, 5.	None		1755	23		54			77	5.6	4.3		73.7		15.	
5, 6, 7, 8.	1/4 lb. Gr. Ars. and Bx	I, II.	2662	15	35	57			85	7.5	6.3	0	78.7	18	15.	0

In orchard of H. H. Thompson, Walpole, N. H. 1906.

Baldwin.																
C 4, 5, 6.	None		Av. 3462	49		29	14.2		51	32.	16.3		34.7		30.	
1, 2, 3.	1/4 lb. P. G. and Bx.	I, II.	2298	27	45	34	7.1	50	73	12.	8.6	24	64.4	48	18.	40
R. 1. Greening.																
C 7, C 8	None		2439	49		41	20.		51	44.	22.4		28.6		43.	
1, 2, 3.	1 lb. A. L., Bx.	I, II.	2949	29	60	35	7.	65	80	20.	16.	28	64.	49	23.	46
4, 5, 6.	1/2 lb. P. G., Bx.	I, II.	2949	24	51	23	5.5	73	76	12.	9.1	59	66.9	53	16.	65

In orchard of Albert DeMeritt, Durham, N. H. 1906.

C 6 to 12.	None		Av. 2345	26.7		49.	13.1		73.3	10.9	8.		65.3		21.2	
11 to 15.	* 1 lb. A. L.	I.	3193	29.	24	62.	12.4	5	80	7.1	5.9	26	74.	25	18.1	14
51 to 55.	* 1 lb. A. L.	I, II.	2922	15.4	48	56.	8.6	26	85	12.	10.6		74.	25	18.7	11
41 to 45.	* 2 lbs. A. L.	I, II.	2766	17.3	35	58.	10.	23	83	5.3	3.7	53	78.	36	12.1	43
46 to 50.	* 1 lb. A. L.	I, III.	2542	16.	40	37.	6.	54	84	10.	8.4		75.	28	14.5	31
16 to 20.	* 1 lb. A. L.	I, II, V.	1793	22.	17	49.	11.	16	78	7.2	8.		72.	19	18.1	14
26 to 30.	1 K. L. B. P. 1/2 lb.	I, II.	2682	20.	24	40.	8.3	36	80	5.4	5.	15	75.	28	12.6	41
21 to 25.	K. L. B. P. 1/2 lb.	I, III.	1563	15.7	41	40.	6.2	52	84	5.5	4.3	24	79.	39	10.7	49
31 to 35.	* 1/2 lb. P. G.	I, II.	2476	17.	37	34.	5.8	55	83	7.3	4.	32	76.8	33	11.8	44
35 to 40.	* 1 lb. P. G.	I, II.	2345	16.8	37	38.	6.3	52	83	5.	4.2	28	78.8	33	10.7	49

\* With 55 Bordeaux in each case. 1 K. L. B. P.—Kerosene-Limoid-Bordeaux-Paris Green mixture.



Table 18. Relative injury by the Codling Moth to dropped and picked apples.--Continued.

In the orchard of W. A. Deering, Pittsfield, N. H. 1907.

Plot.	Trees.	Treatment.	Sprays	DROPPED FRUIT.					PICKED FRUIT.					TOTAL.	
				Average Number Apples.	Per cent. of Total.	Per cent. Benefit.	Per cent. Wormy.	Per cent. of Total Fruit Wormy Drops.	Per cent. Benefit.	Per cent. of Total.	Per cent. Wormy.	Per cent. of Total Fruit Wormy Picked.	Per cent. Benefit.	Per cent. Wormy.	Per cent. Benefit.
<b>C.</b>		<b>None.</b>		<b>Av. 836</b>	<b>46</b>		<b>29.</b>	<b>13.</b>		<b>54</b>	<b>14.</b>	<b>7.56</b>	<b>46.</b>	<b>21.</b>	
A.		Is. only.	I, II, III.	1103	60		22.	13.		40	9.	3.6	52	17.	19
1.		*Al., Bx. Mist.	I, II.	1920	57		3.	1.7	87	43	1.1	.5	93	2.2	90
2.		Al., Bx. Drench.	I, II.	394	40	13	3.8	1.5	88	60	.7	.42	93	2.	90
3.		Al., Bx.	I, II, III.	459	29	36	2.2	.7	94	71	.1	.7	90	.8	96
B.		Al., Bx.	I, II, III.	1769	44	4	2.9	1.2	90	56	.9	.5	93	1.8	91
3-B.		Al., Bx.	I, II, III.	833	38	17	2.7	1.	92	62	.9	.56	92	1.4	93
13.		Al. only.	I, II, III.	1105	24	48	2.6	.6	96	76	.4	.3	96	.9	95
N. Row, 14, 15.		Al. only.	I, II, III.	1605	49	0	10.	5.	61	51	3.5	1.8	76	6.8	69
8, 9, 10, 11, 12.		Al., Benz. Bx.	I, II.	528	34	26	5.6	1.9	86	66	1.5	1.	86	3.5	86
14.		Al. only.	V.	584	28	39	23.	6.4	50	72	5.2	3.7	51	10.	52
15.		Al. and soap.	V.	867	27	41	22.	6.	53	73	7.3	5.3	30	11.	47
14, 15.		Al. (15 and soap)	V.	725	27	41	22.	6.1	53	73	6.4	4.6	39	10.	52
6.		P. G., CuPO.	I, II.	1595	30	34	3.	.9	92	70	1.3	.9	88	1.8	91
7.		HP.G., CuPO.	I, II.	2344	35	24	2.9	1.	92	65	1.2	.8	89	3.3	91
6, 7.		P. G., CuPO.	I, II.	1984	33	28	2.9	.9	92	67	1.3	.9	88	3.5	91
5.		P. G., Bx., K. L. B. P.	I, II, III.	1975	26	43	5.6	1.4	89	74	2.2	1.6	79	3.1	85
4.		P. G., Bx.	I, II, III.	600	29	36	4.6	1.3	89	71	.6	.4	93	1.7	92
4, 5.		Above.	I, II, III.	1173	27	41	5.3	1.4	89	73	1.7	1.2	84	2.7	86

\*2 lbs. arsenate of lead per barrel. 1½ lb. Paris green per barrel; for fungicides used see text.

In the orchard of Gilman Woodman, Durham, N. H. 1907.

<b>C.</b>		<b>None.</b>		<b>5151</b>	<b>30</b>		<b>26.</b>	<b>8.</b>		<b>70</b>	<b>25.</b>	<b>17.5</b>	<b>54</b>	<b>22.7</b>	
11-16.		*Al. Mist.	I.	3193	19	36	4.2	.8	90	81	1.3	1.	94	1.9	91
2.		Al. Drench.	I.	3807	16	46	6.9	1.1	86	84	2.8	2.2	89	2.4	89
4.		Al. Atomizer.	I.	3090	24	20	17.	4.	50	76	5.8	4.4	74	8.5	61
5.		Al.	II.	2764	23	23	33.	7.8	32	77	12.	9.2	47	17.	32
6.		Al.	III.	3203	32		17.	5.6	36	68	9.1	6.2	64	15.	45
39-41.		Al. from above.	III.	5175	18	40	10.	1.9	77	82	2.6	2.1	88	4.	81
44-47.		Al. above and below.	III.	4694	27	10	10.	2.9	63	73	1.2	.87	95	4.2	80
47-48.		Al. and soap.	III.	4053	19	36	12.	2.3	71	81	1.4	1.1	93	2.8	84
48.		Al. bagged.	III.	3924	43		18.	5.8	27	57	8.4	4.8	69	10.7	50
330-332.		Al.	I, III.	2536	16	46	4.1	.65	92	84	1.1	.9	95	1.6	92
A.		Al.	I, III, V.	3512	28	6	5.6	1.5	81	72	1.	.7	96	2.3	90
B.		Al.	I, II, III.	5181	11	63		3.5	93	80	.4	.3	98	.8	96

\*2 lbs. per barrel.



## NEGLECTED ORCHARD

## ORCHARD CARED FOR

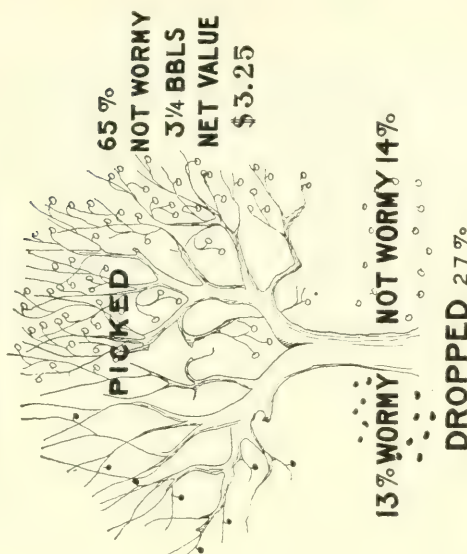
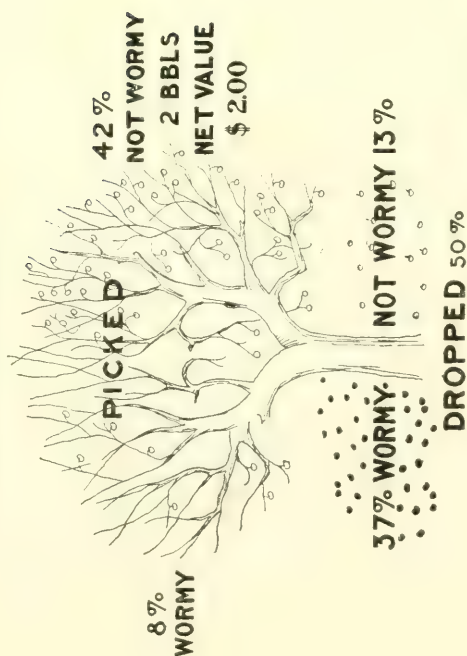


FIG. 40. The price of neglect.



It is evident that the difference in infestation may not have been due to the difference in care, but considering all the conditions in the two orchards, such as location, size of crop, etc., the comparison seems a fair one and the difference may fairly be attributed to the neglect of one and the little care given the other.

TABLE 19. *Showing injury by the Codling Moth in an orchard at Durham, N. H. in 1906 which had had poor care.*

Tree.	DROPPED				PICKED				TOTAL		
	Total.	Per cent.	Wormy.	Per cent.	Total.	Per cent.	Wormy.	Per cent.	Total.	Wormy	Per cent.
1	2215	63	1768	80	1294	37	124	10	3509	1892	54
2	1431	33	969	67	2920	67	323	11	4351	1292	29
3	833	35	576	69	1501	65	298	20	2334	874	27
4	1191	40	890	74	1747	60	304	17	2938	1194	33
5	601	42	445	74	825	58	190	44	1426	635	44
<b>Total</b>	6271	43	4648	74	8287	57	1239	40	14558	5887	40

## THE STRIPED CUCUMBER BEETLE.

*(Diabrotica vittata Fabr.)*

T. J. HEADLEE.

## HISTORY AND DISTRIBUTION.

According to Fitch<sup>1</sup> this insect was named *Cistela melanocephala* by Fabricius in 1871. After some renaming and shifting in systematic position, it received the present name. Shimer<sup>2</sup> published an account of its natural history in 1865, and the same year Fitch published another. Chittenden<sup>3</sup> in 1898, and later, Sirrine<sup>4</sup> in 1899, Garman<sup>5</sup> in 1901, and others at various times, have contributed to our knowledge of its habits and life history. In his discussion in 1865, Fitch gave a clear account of the measures of control he had found best, and other suggestions have since come from many sources.

According to Chittenden<sup>3</sup> the striped cucumber beetle occurs in practically all the states east of the Rocky Mountains and in the state of Washington.

## LIFE HISTORY AND HABITS.

*Hibernation.* It was first thought, notably by Shimer, that this insect passed the winter in the pupal stage, but since that time opinion has changed until it has come to be generally agreed that the beetle passed the winter as an adult. Riley<sup>5</sup> inferred the hibernation of adults from their presence in the fields after heavy frosts, and many have confirmed his observations and noted that they appear to be driven into winter quarters by the cold. Garman<sup>5</sup> found a hibernating beetle December 6th with a mass of rubbish and other insects under boards, and he carried some adult beetles collected in the fall through the winter in the soil of his vivarium. In New Hampshire we found that all the pupae in our breeding cages transformed to adults before cold weather.

1. 10th Rept. on the Noxious and Other Insects of the State of N. Y., 1865, p. 438 of the Trans. of the N. Y. State Agric. Soc. for 1864.
2. *Prairie Farmer*, Aug. 12, 1865.
4. Bul. No. 10, n. s., Bureau of Ent., U. S. Dept. Agric., 1899, pp. 26-30. Bul. No. 19, n. s., Bureau of Ent., U. S. Dept. Agric., 1899, pp. 48-51. "Insects Injurious to Vegetables."
5. Bul. No. 158 of the N. Y. Agric. Expt. Sta., Geneva, 1898.
6. Bul. No. 91 of the Kentucky Agric. Expt. Sta., 1901, pp. 3-16.
7. Circ. No. 31, Revised edition, Bur. Ent., U. S. Dept. Agric., p. 1.
8. 2d Rept., Noxious, Beneficial and Other Insects of Mo. p. 66
9. l. c. page 4.

The date at which the beetles appear in the spring seems to vary with the season and latitude from some time in April to early June. Many writers simply make the general statement that they emerge in the early spring. Fitch<sup>1</sup> speaks of their appearance in New York in May. Chittenden<sup>2</sup> speaks of their appearing about Washington, D. C., some time in April, Smith<sup>3</sup> mentions them as appearing in New Jersey in May, Serrine<sup>4</sup> says that in New York the date varies from April to the first of June, Garman<sup>5</sup> records their earliest appearance in Kentucky as April 12th, and in 1907 in New Hampshire we found them June 1st. They did not appear on cucurbits until June 24th.\*

It is generally agreed that the beetles frequently emerge before the cucurbitaceous plants are above the ground, and that they feed on almost anything they can get. They have been recorded as feeding at this time on the leaves of horse chestnut and such fruit blossoms as they can find. Fitch<sup>6</sup> spoke of them as abundant on the leaves and blossoms of *Crataegus* and thought that they probably fed on them. We found them feed-

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1. l. c., page 438.

2. Bul. No. 10, n. s., Bureau of Ent., Dept. Agric., p. 29.

3. Rept. of N. J. Agric. Expt. Sta., 1892, p. 43.

4. l. c., p. 6.

5. l. c., p. 4.

6. l. c., p. 439.

\*An effort was made to secure some information concerning the hibernating habits experimentally in the fall of 1907. 200 beetles were placed in each of four large cages in which young seedlings were available for food. These cages were placed in a squash patch and beneath them wire screening was placed 3, 6, 12, and 18 inches beneath the surface, so that beetles entering the soil could not penetrate beneath these screens. In this way it was thought that we might be able to determine how deep the beetles hibernate by the number emerging in each cage the next spring. The beetles were observed as numerous in the cages until the last week of September. 25 were observed on plants in one cage on September 30. The bottoms of the cages were covered with old vines. On Oct. 10 we recorded that after several frosts practically all the beetles in the cages had disappeared. The time of entering hibernation seems to be coincident with the first frosts and does not seem to be determined by the mean temperature of the day. Another cage with a similar number of beetles was placed in a pine grove where the soil was covered with pine needles and potted plants for the beetles to feed on during the fall were introduced. The winter passed with very little snow, but unusually deep and severe freezing of the soil. Whether as a result of this or not we cannot at present state positively, but not a single beetle appeared in any of these cages in the spring of 1908. Furthermore there were very few beetles to be found on young squash and melons until late in June and then so few as to cause no appreciable damage. (E. D. Sanderson.)

ing at such times on the leaves of elm, and more abundantly on leaves and blossoms of syringa. Sirrine<sup>1</sup> emphasizes the fact that their appetite between the time of emergence and mating is so voracious that they will eat almost anything, but after pairing begins they refuse to eat food covered with a foreign substance. The adult insect has been recorded as feeding upon beans, peas, wild balsam apple, young leaves of horse chestnut, cotton pollen, the flowers of both cultivated and wild asters, on the spotted crane's-bill, the silks, pollen and unripe kernels of corn, the blossoms of apple, chokecherry, juneberry, cherry, and related plants, sunflowers, goldenrod, and possibly leaves and flowers of *Crataegus*.

In New Hampshire the insects were pairing when they attacked the squash and cucumber plants, and, like those observed by Sirrine<sup>1</sup>, they refused to eat any part of the plants covered with a foreign substance, but would seek for spots that had been left untouched. From the first appearance of these plants until they began to blossom, the beetles deserted all other sorts of food, feeding on their leaves and stems, always selecting the tenderest parts within reach. At this time they tended to concentrate on the tender replants and quickly destroy them. When the flowers appeared the beetles turned their attention to them, seeming to feed mainly on the pollen. Sanderson<sup>2</sup> records their feeding on, and seriously injuring, the pistils in Delaware. In the fall we took them on the flowers of goldenrod and on the plants in the patch until early October, when they were found entering winter quarters. Sirrine<sup>3</sup> states that pairing begins about the middle of June and continues until the middle of August, and that the males will sometimes attempt to pair with the twelve-spotted species.

*Oviposition.* In New Hampshire the beetles were found pairing freely on June 24th, and copulation continued until about August 30th. We, also, found the males attempting to pair with the twelve-spotted beetles. Garman<sup>4</sup> records Jan. 18th and July 26th as the limits of oviposition in Kentucky. Sirrine<sup>5</sup> says that dissections show that egg-laying could begin June 20th, but that in 1898 it did not begin until July 20th, and that the

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1. l. c., page 6.

2. Rept. of Agric. Expt. Sta. of Delaware, 1900, page 209.

3. l. c., pages 6-7.

4. l. c., page 6.

5. l. c., pages 7 and 8.

egg-laying period is about one month. Our observations showed the period of oviposition to be of about the same length, the first eggs in 1907, being obtained July 2nd and the last August 6th.

Fitch<sup>6</sup> says that the beetles drop the eggs about the plants, but does not signify whether above or below the surface of the soil. Sirrine's<sup>7</sup> observations led him to conclude that the beetles dropped their eggs wherever they happened to be feeding. Garman<sup>8</sup> says that the beetles creep into crevices alongside or near the plant to deposit their eggs, and that they are placed, as a rule, near the surface. In New Hampshire, in both field and cage, we found the eggs deposited in the surface of the soil, singly or in groups, usually within a crack or crevice, anywhere within several inches of the plant. The female beetles appeared to make a special effort to place the eggs on damp soil, but did not especially favor the place between stalk and soil. On the afternoon of July 10, 1907, it was our good fortune to observe a female beetle ovipositing in one of the cages. As the pair had been in the cage 16 days when the beetle deposited the eggs, and as they seemed well satisfied, it is reasonable to regard the following actions as very closely approaching the normal. The female was walking about on the soil and poking her head into every crevice, moving her antennae with peculiar vigor when examining such places. Apparently unable to find any place more to her liking, she stopped over a tiny crevice, and, curving the tip of her abdomen downward until it almost or quite touched the soil, remained in that position for about ten seconds, giving two downward pushes, apparently accompanied by a contraction of the abdominal walls. Later examination showed within this crevice, just barely below the general level of the soil, an oval, lemon-yellow egg. From this point she passed outward toward the rim of the pot and soon came to a deep furrow in the soil where the steel rim of the cage had formerly been inserted. She at once crawled into it and deposited two more eggs, one on the side of the furrow, near the bottom, and the other quite on the bottom. These eggs, in due time, gave forth healthy larvae. Very few facts appear to have been accumulated to show the number of eggs that a single female may produce. Dissections of 18 gravid females showed an average of 33 eggs, with

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6. l. c., page 439.

7. l. c., page 7.

8. l. c., page 6.



an upper limit of 59. Five pairs, confined in breeding cages, produced an average of 88 eggs per pair.

*Egg.* The egg was first described by Chittenden<sup>1</sup> and very soon afterwards by Sirrine<sup>2</sup>. Few data are available on the length of the egg stage. In 1906 we attempted to determine the length of egg stage by placing freshly deposited eggs in glass tubes, the open ends of which were covered with muslin. The tubes were then sunk vertically into the moist soil so that the upper ends were even with the surface. More than 100 eggs were thus experimented with. We found this unsatisfactory because of the difficulty of making the examination and because the larvae escaped through the cloth into the soil. Such of the eggs as we were able to observe, required from eight to twelve days to hatch. The same season's work also convinced us that the eggs should have moist conditions for their development. In 1907 the freshly laid eggs were placed in a moist chamber made by sealing a glass ring, from 1-4 to 1-2 inch high, to a glass slide with paraffine and sealing over the top a cover glass carrying a hanging drop of water. The eggs were thus subjected to a saturated atmosphere and the cells were kept in almost complete darkness. Every day they were examined with hand lens and microscope and unsealed as often as eggs hatched or the drops needed replenishing. Hatched larvae were removed as soon as they appeared. The cells were exposed to air at an average mean temperature of 74 degrees F.,\* and 32 eggs observed required an average of 7.7 days for hatching.

When first laid the egg has a diffused lemon-yellow color, but as development progresses, the color concentrates in the forming embryo. When fully developed the embryo extends almost completely around the egg in the long diameter. A larva which we observed cut a tennis-racquet-shaped hole near one end and crawled out.

*Larva.* The larval form was mentioned by both Shimer and Fitch. According to Thomas<sup>3</sup>, Dr. Shimer gave the length of

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1. I. c., p. 48.

2. I. c., p. 10.

3. Trans. Ill. Hort. Soc., Vol. XI, p. 167.

\*The average mean temperature has been computed by (1) averaging the mean temperature of the days through which each egg passed before hatching, and then (2) averaging the average mean temperature of all the eggs. The number of daily mean temperatures averaged for each egg will be larger than the number of days in the stage by 1 because the temperature of both the first and last day must be considered.



the larval stage as about one month. J. B. Smith<sup>2</sup> says the larva matures in three weeks; Serrine<sup>3</sup> expresses the opinion that it varies from one to two months according to the food supply. Garman<sup>4</sup> records the average length of larval life in Kentucky as 19 days. In New Hampshire, under an average mean temperature of 73 degrees F., 24 individuals spent an average of 27.1 days in that stage.

When first hatched the larva is very active and crawls rapidly about, occasionally stopping to raise one-half or more of its body from the ground and wave it back and forth. In a moist chamber the just-hatched larva will crawl about as much as two days without food, but if subjected to dry air it quickly perishes. The ability of the larvae to move through damp soil was demonstrated repeatedly in the course of this study, but when placed on it, they showed no more tendency to crawl toward the food plant than away from it, though all showed the disposition to go into the earth at the first opportunity.

According to Fitch, the larva lives in the succulent parts of the infested cucurbit, between the surface of the soil and the fibrous roots, boring out the stalk and killing it. Sometimes, according to the same author, they will be found attacking the sprouts of seeds that have been planted to take the place of the plants destroyed. Lintner<sup>5</sup> records an instance where seven nearly full-grown larvae were taken from the stem within a length of two inches. Most of the later investigators have contented themselves with the statement that the larval stage is passed in the soil about the roots. Serrine<sup>4</sup> points out the fact that they also attack vines and fruit when these lie on damp soil, and that he has rarely found them attacking the stems of muskmelon. Neither has he been able to find them feeding on the roots. In New Hampshire we found the larvae feeding on the roots, as Fitch describes, and in some cases boring up into the stem. In our breeding cages the larvae very generally mined the stem, sometimes as high as two inches above the ground. In 1906 and 1907 the number of larvae to be found on the plants seemed very small in comparison to the number of eggs laid and the number of beetles into which they must have developed.

*Pupation.* According to Fitch<sup>5</sup>, the larva when full grown, crawls away from the roots and forms a cavity in the ground

2. Rept. Agric. Expt. Sta. of N. J., 1890, p. 481

3. l. c., pages 6 and 7.

4. l. c., p. 8.

5. l. c., p. 436.

by turning itself round and round until the wall is smooth, and so hard that it will not break open from any disturbance of the surrounding earth likely to be made by hoe or plow. Garman<sup>1</sup> notes that the larva becomes greatly shortened before transforming. Our observations verify both of these statements, except in the particular of the resistant nature of the cells. Those with which we worked seemed to have frail walls. The cell may be broken open and, unless the larva has begun to shorten and stiffen, it will form a new one. If, however, it has greatly shortened and thickened it will make no attempt to construct a new cell, but will transform to a pupa as best it may. There is some indication that the depth at which the cell is constructed depends upon the soil moisture. In cages where the soil was moist all the way to the top, the cells were constructed within one-half inch, or even less, of the surface, but in others where the surface soil was dry, the cells were constructed in the moist soil, even when that was two and one-half inches below the surface.

Chittenden<sup>2</sup> determined that in August with temperature from 75 degrees to 85 degrees F. the pupal stage can be passed in seven days. Garman<sup>1</sup> determined the pupal stage as about 8 days. We found it necessary to break the larval cell to tell when the pupal stage began and the results were, therefore, hardly normal. Records from 10 pupæ show that an average of 13 days is required to complete this stage under an average mean temperature of 65.9 degrees F. Records of 14 individuals, which were undisturbed from formation of larval cell to adult, show that an average of 23 days was required for the insect to pass this stage under an average mean temperature of 66 degrees F.

*Seasonal history.* Garman<sup>3</sup> found that the period from hatching to adult varied from 26 to 33 days, and that the records of 10 beetles gave an average of 38.5 days. It was to be expected that the length of this part of the life cycle in New Hampshire would be greater because of the lower temperature, but the difference is so remarkably large that it will be well to submit the records on which our conclusions are based. Fourteen individuals, which were undisturbed, required an average of 54.14

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1. l. c., p. 7.

2. Bul. No. 10, n. s., Bureau of Ent., U. S. Dept. of Agric., p. 29.

3. l. c., p. 7.

4. l. c., p. 9.

days to pass from hatching of egg to adult, under an average mean temperature of 69 degrees F.

TABLE I. *Records of individuals that were undisturbed by breaking of larval cell from hatching of egg to emergence of adults*

Cage No.	No. of larvae.	Date of hatching.	Date of adult beetle emergence.	Length of period in days.
21	1	7-27-'07	9- 9-'07	44
21	1	"	9-25-'07	60
21	1	"	"	60
2	1	7-19-'07	9- 9-'07	52
6	1	7-25-'07	"	46
20	1	7-27-'07	9-13-'07	48
20	1	"	10- 1-'07	66
3	1	7-25-'07	9-18-'07	55
12	1	"	"	55
12	1	"	"	55
23	1	8- 1-'07	9-20-'07	50
23	1	"	"	50
23	1	"	9-25-'07	55
4	1	7-25-'07	"	62
14		Average length of period, 54.14 days		

The length of period from the hatching of the egg to adult, 54.14 days, added to the average length of the egg stage, 7.7 days, gives a total of 61.8 days required to complete the life cycle, under an average mean temperature of 70 degrees F.<sup>1</sup> Breaking the larval cell seemed to shorten the time necessary for the insect to pass from hatching to adult. Twenty-two individuals that passed this stage under these conditions required an average of 46.8 days under an average mean temperature of 70 degrees F. The soil of the cages was kept moist but not wet. Indeed, during most of the time, a thin surface layer was kept dry and pulverized.

Most writers seem to be of the opinion that the insect has two to three broods annually. Chittenden<sup>2</sup> summed the matter up, in 1903, as follows: "Considering its long season and the fact that newly transformed beetles have been observed from the second week of July till the first week of October, there is comparative certainty of two generations, as generally admitted, each year in the northernmost locality inhabited by the species,

1. The average mean temperature for the whole period was determined in this case by multiplying the average mean temperature for each of the two periods considered by the number of days—1 in each period, respectively, adding the results and dividing the sum by the total number of days+2. (See note on p. 503.)

2. Cir. No. 31, Revised edition, Bureau of Ent., U. S. Dept. of Agric., pgs. 3-4.

and it is safe to assume the existence of three generations annually from the District of Columbia southward," but Sirrine<sup>1</sup>, basing his conclusion upon field observations and dissections, says, "The dissections of the females of the new brood show, also, that the reproductive organs are not developed and do not develop even as late as the middle of October. Furthermore, by the dissection it was shown that a large amount of fatty tissue is formed preparatory to hibernation. In addition to the above facts, observation in the fall showed that there was no tendency to mate during the fall. Hence, it is evident that the statement that there is more than one brood each year is wrong."

TABLE II. *Results from dissecting beetles gathered at different periods throughout the summer and early fall.*

Date of Collection.	No. of Females.	No. with well developed eggs.	Total No.	Number parasitized.	Females parasitized.
6-28-'07	8	5	28	2	1
7- 1-'07	5	3	18	1	1
7-30-'07	7	3	26	2	0
8- 5-'07	8	5	22	4	1
8- 8-'07	2	0	8	3	1
8-13-'07	3	0	12	6	3
8-14-'07	0		6	3	0
8-22-'07	3	0	21	5	1
8-31-'07	15	0	24	3	3
9- 7-'07	8	0	18	0	0
9-12-'07	8	0	14	0	0
9-18-'07	5	0	9	0	0

In 1902 Mr. A. F. Conradi, then connected with the New Hampshire station, carried on some breeding work in which he found that the adult beetles emerged in his cages from August 19th to October 2d. We introduced a copulating pair of beetles into each of twenty-two cages at dates ranging from June 26th to July 8th, 1907, and two additional cages were stocked with males and females taken from different plants, No. 23 on July 5th, and No. 24 on July 16, 1907. Squash seeds were planted every few days so that the beetles always had a supply of succulent food. Just-hatched larvae from eggs laid by beetles in the cages that have already been described, were introduced into twenty-four other cages, also kept supplied with succulent squash in the same way. Of the 48 cages, 24 gave forth beetles of the new brood. A total of 71 beetles emerged. The first came out

1. l. c., p. 9.

August 26th, the last Oct. 1st, and the majority had emerged by September 19th. The last eggs found were laid in a cage by a beetle introduced July 16th. For some days before this date we had been unable to find eggs in the field. The table shows that we have been unable to find developed eggs in the female beetles collected on and after August 8th. The average length of life cycle, 61.7 days, or even the shortest in our record, 51.7 days, is so long that the maturing of the second brood after the earliest emergence would seem impossible. Accordingly, we are driven to the conclusion that the beetle is single-brooded in that portion of its range which includes New Hampshire.

#### NATURAL ENEMIES.

In 1871 Shimer<sup>1</sup> gave an account of a dipterous parasite that he had bred from the adult beetle. It was described under the name *Tachina* (*Melanosphora*) *diabroticae*. Chittenden<sup>2</sup> records finding the dipterous parasite, *Celatoria diabroticae*, which he identifies with that found by Shimer. He also considers the form, *Celatoria crawii* Coq., reared in California from *Diabrotica soror*, as the same form. Others record the finding of similar dipterous parasites in the adult beetles. We found them thus infested. The natural enemies of this insect are totally insufficient to keep it from being seriously injurious to crops.

#### INJURY.

According to Fitch<sup>3</sup>, and others, the injury is largely due to the overwintered beetles eating the seed, leaves and stems of the emerging plants, sometimes nipping them off before they reach the surface of the ground, later to their consumption of the tender parts of stem, foliage, and flowers, and to their habits of attacking the fruit, and partly due to the destruction of the roots, stems, fruit, and sometimes of the just-bursting seeds, by the larvae. Serrine<sup>4</sup> says that the larvae attack the stems and fruit where these come in contact with the moist soil. In New Hampshire all the types of injury described, except that by the larvae to the fruit and vines in contact with moist soil, were observed. It has also been found by us that the feeding of the beetles on squash stems frequently results in a form of injury that makes its appearance only after the plant is well grown,

1. Amer. Nat., Vol. V, pgs. 217-220.

2. Bul. No. 10, Div. of Ent., U. S. Dept. of Agric., pgs. 29-30.

3. l. c.

4. l. c.



If the beetle fails to gnaw entirely through the stem, the wound will harden and heal, leaving a marked scar; the plant will grow until it becomes bushy and begins to run, then in the first hard wind will snap off at the point of injury. Galloway<sup>1</sup> found that the adult insect was capable of disseminating a bacterial disease of melons and related plants.

Comparative few facts have been collected to show the extent of the injury, but Fitch<sup>2</sup> speaks of it as the "worst insect in our gardens" and Riley<sup>3</sup> maintains it is "an insect which annually destroys thousands of dollars' worth of vines in the United States." Judging from the report of Sirrine's experiments in Long Island, the insect, when abundant, is fully capable of destroying 100 per cent. of the unprotected crop, and at least 10 per cent. of that part of the crop for the preservation of which a struggle is made.

#### MEASURES FOR CONTROL.

The fact that the beetles could be driven away temporarily and the plants rendered distasteful by the careful application of a dust or spray, and that in some seasons such treatment was sufficient to protect the cucurbits from their ravages, led to experimentation with a host of substances that acted purely as repellants. Among those, with little or no practical value, may be mentioned charcoal, soot, road dust, saltpetre, cow manure, chicken manure, burdock infusion, "Slug Shot," hellebore, rags and corn cobs soaked in kerosene, bi-sulphide of carbon, land plaster, and X.O. dust. Among those that have proven more useful are ashes, air-slaked lime alone or with arsenites, tobacco dust, and Bordeaux mixture alone or with Paris green. In the course of our experimental work a number of these substances were tried, and in order that the basis for our conclusions may be plain, I will briefly describe the experiments. Half an acre of cucumbers was divided into 10 plats, and two and one-half acres of squash were divided into 8 plats. Each of the first six treatments was applied to both cucumbers and squash. These were: Bordeaux mixture (3 pounds copper sulphate, 4 pounds of lime and water to make fifty gallons); Bordeaux plus Paris green; "Bug Death"; tobacco dust; road dust; arsenate

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1. "Insect Life," Vol. VI, p. 122.

2. l. c., p. 433.

3. Second Ann. Rept. on the Noxious, Beneficial and Other Insects of the State of Mo., 1870, p. 64.



of lead, 3 pounds to 50 gallons of water. Hammond's "Slug Shot," sulphur, air-slaked lime plus sulphur, were applied to three other plats of cucumbers, and arsenate of lead, 6 pounds to 50 gallons of water, was applied to another squash plat. The treatments were applied as soon as the beetles appeared and renewed as often as necessary to keep the plants well covered. The beetles were only sufficiently abundant to destroy about one-fourth of the plants in the check plats, but the effect of their work appeared in the setback the plants of these plats experienced. In perfect agreement with the finding of others, the road dust proved to be of little or no value. "Slug Shot" and sulphur appeared to partially protect the plants from the beetles, but seemed seriously to check their growth. "Bug Death," on the other hand, appeared to be as useful as tobacco dust and to afford pretty satisfactory protection without doing noticeable injury. The air-slaked lime and sulphur combination proved quite as useful as the tobacco dust. Bordeaux mixture so seriously checked the growth of the plants treated that the plats on which it was used made decidedly less growth. Arsenate of lead gave just as perfect protection as the Bordeaux or any of the dusts, and did not appear to injure the plants in the least. The arsenate of lead plats made the best growth of any, and the cucumber division produced the earliest cucumbers in the patch. Three pounds of arsenate of lead to 50 gallons of water, seemed just as effective as six pounds.

Many efforts have been made to find some other way of killing the beetles than hand-picking. Gillette<sup>1</sup> found that dry pyrethrum dusted on the plants while the dew was on would kill many of the insects. He records the finding of 280 dead beetles about forty hills of squash that had been treated with this substance. Smith<sup>2</sup> found that sludge-oil soap would also destroy the beetles. Sirrine<sup>3</sup> found that the insects could be successfully poisoned only twice during the year, because at other times they refused to eat plants covered with a foreign substance. These favorable times were between the time of emergence from winter quarters and the beginning of pairing, and in the fall when food becomes scarce. In 1907 the beetles were paring when they attacked the cucurbits and fed on blossoms of these plants until frost. A favorable time for killing

1. Bul. No. 5, Iowa Agric. Expt. Sta., 1889, p. 176.

2. Rept. of Agric. Expt. Sta. of N. J., 1890, p. 482

3. l. c., pp. 6 and 12.

the beetles did not arrive, but this is the record of only one year. Although we kept young and tender squash plants dusted with Paris green throughout the time the general experiment was in progress, we were unable to poison the beetles with either Paris green or arsenate of lead. They would not eat the parts of the plant covered with the poison. Sirrine<sup>1</sup> found trap crops very useful on Long Island in saving regular crops, and our experience in New Hampshire would indicate that they might prove valuable there, for when plenty of clean, tender squash plants were to be had, the beetles avoided the treated cucumbers and squashes. Squash plants may be used as traps

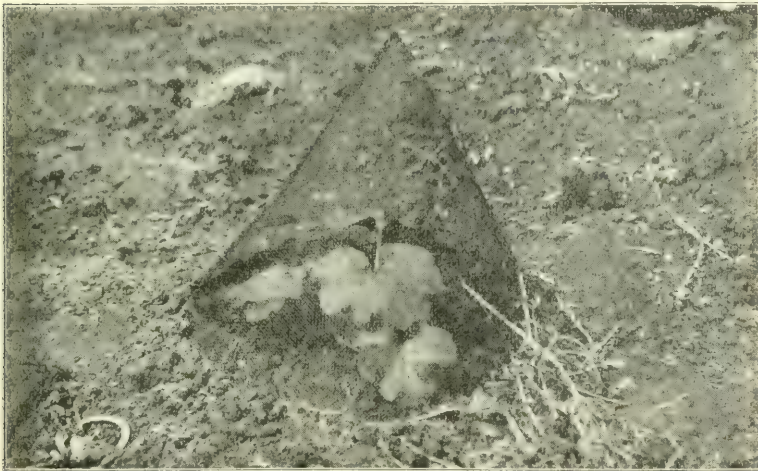


FIG. 41. Wire covers for melons.

for both of these crops, provided the latter are covered with some foreign substance to render them distasteful.

In cases of extreme infestation, covering the plants seems to be the only means of saving them. Before 1852, more than 13 years before the natural history of the insect was understood, covers were recommended as a means of preventing its damage, and during the succeeding years many types have been devised and described. Among these may be mentioned: the box covered with cloth and later with wire; a piece of cloth sup-

1. *l. c.*, pgs. 14-16.

2. *Insects Injurious to Vegetation*. Harris, Third Edition, 1862, pp. 125-126.

ported by the half of a barrel hoop, set over the plant like a croquet wicket, or by two of these set at right angles, or by wires set like the barrel hoops; cloth nailed to the one side and two ends of two rectangular boards each  $\frac{1}{2}$ " x 6" to 8" x 16" and furnished with a sharp stake projecting from the side opposite to the one on which the cloth is nailed to be thrust into the ground on each side of the hill in such a way that the cloth will be stretched and the loose edges may be rendered beetle-tight by putting soil on them; planting the seed in holes 5 or 6 inches deep and covering them with a sheet of glass; wire plate-covers, etc. In our work we found that a useful type of cover may be made as follows: Secure yard-wide screen wire of slightly smaller mesh than the ordinary window screen and cut off one yard; the piece will then be one yard each way. Describe a circle on this piece, having a diameter of 36 inches, and cut off the corners. Then divide this circular piece of wire into two equal parts, fold the straight cut equally upon itself, bend the two edges over together twice and hammer them down firmly. Thus, a cone-shaped wire cover, costing a few cents and capable of withstanding several years' wear, is ready for use. Two covers can be made of each square yard of wire. The greatest objection to the use of covers lies in their cost, although some investigators have suggested that they may weaken the plants, especially if left on too long. For the kitchen garden or for fancy vegetables, covers will prove useful and practicable, when the bugs are especially abundant or when time does not permit the use of other measures. The time comes, however, when the plant has reached such a size that the cover must be removed. If the beetles begin to injure the plants seriously at this time, they must be treated with tobacco dust or arsenate of lead, or, should the plants be threatened with fungous diseases, they should be treated with Bordeaux mixture instead of the tobacco or lead.

In New Hampshire the grower who expects to raise large acreage and to dispose of his crop at other than fancy prices, will probably get the best results from a combination of methods such as the following: A week or ten days before the regular crop is set out, plant squash-seed around the prospective field and through it at intervals, if it be large. Plant more trap-squash seed when the regular crop is put into the ground. From the first appearance keep the regular crop thoroughly covered with arsenate of lead (applied with a sprayer at the rate of three pounds to 50 gallons of water) or with tobacco dust, if



FIG. 1.—Egg, enlarged.



FIG. 2. Larva, enlarged and natural size.



FIG. 3. Pupa in earthen cell, enlarged.



FIG. 4. Pupa, enlarged and natural size.



FIG. 5. Adult beetle, enlarged and natural size.

THE STRIPED CUCUMBER BEETLE (*Diabrotica vittata*.)





preferred. Plant another set of trap squash seed a week or ten days after the main crop has been started. As soon as the plants of the main crop begin to run, if they are cucumbers, the tobacco or lead treatment should be stopped and the plants treated thoroughly with Bordeaux mixture to protect them from fungous disease. It is possible that when cucumbers are to be protected so many of the beetles will congregate on the trap-squash that treatment of the cucumbers may be unnecessary. The grower will find that the rapid growth induced by good

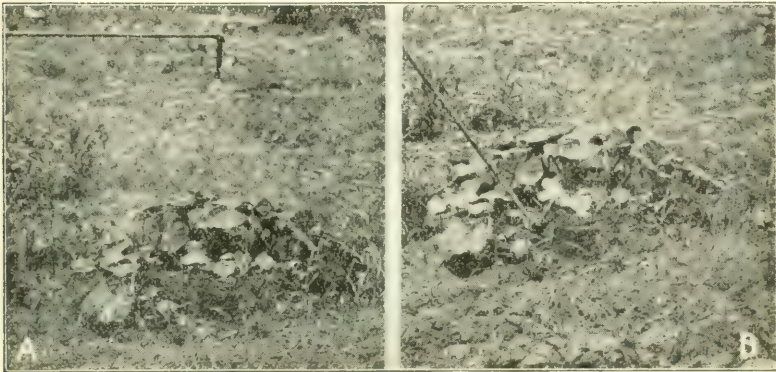


FIG. 42. Spray rod with nozzle attached at right angles to facilitate spraying from above as shown at A, and from beneath as at B.

fertilizing will help the plants quickly to grow beyond the power of the beetles to harm them. As Smith suggests, clean farming, by depriving the adults of good wintering places close at hand, may go far toward reducing the number to be contended with the following spring.

The larva of the striped cucumber beetle does so comparatively little damage that small effort has been made to find a way of combating it. Fitch's suggestion that covering the plants will probably enable them to escape the work of the larva, seems the best for which our present knowledge gives basis.



## THE ANTLERED MAPLE CATERPILLAR.

*Heterocampa guttivitta* Walker.

C. F. JACKSON.

Of the many insect enemies of our forest and shade trees, perhaps none has caused more general alarm during the past year than the Antlered Maple Caterpillar. Being comparatively unknown by people in the state, its sudden appearance and the complete defoliation of large tracts of valuable woodland were sufficient to alarm not only the lumbermen but also the summer residents and farmers.

So far as known this insect has never before attracted attention or caused any appreciable damage, except in Maine in 1907. In fact, on an extended trip through the infested region but one or two persons could be found who remembered ever having seen the caterpillar before.

To the entomologist, however, this species is not new, the adult having been described as early in 1855 by Walker in the "Catalogue of the Lepidoptera of the British Museum," and named, *Cecrita guttivitta*. Later (1880) the larva was first described by French. In 1895 Packard gave an extended account of the life history and distribution in his "Monograph of the Bombycine Moths." He notes that the larvae feed on a variety of trees, but up to that time had not been numerous enough to attract any attention. The first serious outbreak seems to have been in Maine within the last three years, when great areas of valuable forest were defoliated, (1907. Patch, E. M., Me. Agr. Exp. Sta., Bull. 148.), while in New York considerable damage resulted from attacks of this insect during 1907. Judging from these facts it seems plausible that this pest has been gradually increasing within New Hampshire until the present year, which has been unusually well adapted for its development.

## GENERAL DESCRIPTION AND LIFE HISTORY.

The adult form of the Antlered Maple Caterpillar may be described as a mottled-gray moth densely covered with scales, and the wings marked with scalloped cross bands. The moth is of medium size, and when resting on dead leaves is scarcely visible so perfect is its protective coloration. Like the remainder of this group it is nocturnal in its habits, flying only at night, at which time the eggs are probably deposited. Con-

cerning this habit but little or nothing is known. Eggs have been found at Brunswick, Me., July 3 (Packard), hatching about a week later.

It is from the first larval stage that this species takes its name. The larva, as described by Packard, is about 5 mm. long, of a uniform dark chestnut or reddish brown, the body tapering from the head backward, and "possessing at this stage an extraordinary armature of nine pairs of enormous horns like those on a deer. The prothoracic pair are nearly three times as large as those on the first abdominal segment." Following this stage a radical change occurs before the larva reaches its full development, the horns or tubercles being lost, and the color changing from brown to green.

The full-grown caterpillar varies greatly in its general appearance. It is a green caterpillar, about 40 mm. (1 3-5 in.) long, with a purplish-brown, saddle-shaped marking near the middle of the back. In the last stage before pupation all the purplish-brown may be lost, the worm having a uniform green color. Some, however, seem to retain the brown, while others are green almost their entire life.

After feeding for about four weeks the larvæ drop to the ground and crawl under the leaves, where the change to the pupal stage occurs. The pupa is about 18 mm. in length, of a dark reddish brown, and extremely difficult to distinguish from the pupæ of many other members of this group. It is in this stage that the winter is passed, the adult moths issuing the next June.

*Technical Description of Adult.* General color pale ash gray, a silvery cast in certain lights, an olive green reflection in others. Fore wings mottled with dark and light patches, the veins being nearly black. Head and base of antennae yellowish, palpi ash-colored. Eyes brownish black. Thorax ashen, much darker along posterior edge, and near base of wings. Tips of forewings lighter than base, of a greenish cast, and edged with a fine fringe, at the base of which is a black line connecting the veins. A double row of very faint scalloped markings cross the wing about two-thirds the distance from the base. Midway between the base and tip of the wing is a crescent-shaped mark of ash-bronze.

Hind wings ash gray, light at base, dark toward tip, and along costal border. Base of wings covered with long, fine hair. Distal margin fringed and marked with black as in fore wing. Trace of a whitish line across wings, more distinct near costal

border. Veins dark, as is the fringe at the terminus of each vein.

Body ash, mottled with black and white. Under part of wings and thorax ash white, thorax covered with long, silken hairs on under side.

Length 16.5 mm.; wing expanse 38 mm.

The difference in appearance of the sexes is very slight, the foregoing description being that of a female. According to Packard considerable geographical variation seems to occur, but in looking over a number of New Hampshire specimens very little, if any, variation was evident.

*Habits of the Adults.* As already mentioned but little is known of the habits of the adult moth. From observations in the laboratory the moths are entirely nocturnal in their habits, remaining quiet in the daytime when they may be easily captured. The eggs are probably deposited on the leaves, egg deposition extending over a considerable length of time, for the species, if not for the individual, as larvæ of all sizes were found July 20, although on that date by far the larger number were ready to pupate. There seems, also, to be a tendency to a second brood, as one moth emerged the first of August and others appeared later. From this it seems reasonable to expect the adults any time during the spring and summer. Several moths, which I think were of this species, were taken at Tamworth, July 20-25, resting on the bark of beech and maple trees, a number were also taken by means of a trap lantern at night. However, they were in too battered a condition to make identification certain. The last moth to emerge in the laboratory was October 15, but beyond a doubt this was unusual, although the temperature conditions were about normal.

*Description of Larval Stages.* The exact period of incubation for this species is not known. However, emerging from the egg is one of our most peculiar larvæ. According to Packard, "The larva is the most remarkable of its family, in possessing at this stage, an extraordinary armature of nine pairs of enormous horns like those of a deer. The prothoracic pair are nearly three times as large as those on the first abdominal segment, and arise from a dark piceous plate, each horn is stout, about twice as long as the body is thick, with two stout acute tines reaching forward and outward, and a third upward, with a fourth small sharp one projecting in front near the base; each tine bears a hair arising from near the end. The tines are, more or less, rough and finely spinulose, especially on the opposing

bases of those projecting upward and backward. The second and third thoracic segments are smooth, and unarmed, and much wrinkled transversely. On the first abdominal segment is a pair of long, slender horns with the distal third, smaller and bent forward and outward, with the end thickened and bearing two or three minute spinules, and a single long hair; this pair arises from a large, black, dorsal undivided plate, while those behind (on second to seventh segments) arise from a more rounded black plate, divided into two half-moon-shaped pieces by a distinct greenish yellow space. Those of the second abdominal pair are much smaller than the pair in front and those behind. Those of the third abdominal segment are not so large as the first, but much longer than those behind. The pair on the eighth abdominal segment are of the same size and shape as those on the first abdominal segment, but are slightly shorter. The suranal plate is rounded, convex, shining black, giving rise to a pair of black horns shorter than the shortest ones in front. Thoracic legs blackish; the middle abdominal legs of a pitchy color."

This stage lasted nine days, during which time it fed on the under side of the leaf, eating out little irregular patches.

Following this stage a radical change occurs, the larvæ assuming an entirely different aspect. The reddish-brown color of the body is still retained but all of the tubercles are lost, with the exception of those located on the pro-thorax. These latter are much smaller than in the first stage, consisting of but a pair of short, straight horns. Numbers of larvæ in this stage were found at Tamworth, July 20. However, most of these were in badly-infested regions where the food supply was limited, probably retarding their development. Great variation was noted, both in the size and color, many individuals having nearly the same markings as the mature larvæ, but still retaining the horns.

Following this stage it is almost impossible to separate the larvæ into definite groups, although Packard describes three more distinct stages. In looking over an unlimited number of specimens three general types may be found, although they grade inseparably into each other. The following description will apply to a large majority of healthy, full-grown larvæ just before the last stage is reached:

Head, lemon yellow, a blackish-brown streak extending from vertex over either eye to bases of palpi, forking just before reaching mouth parts. Another spot of the same color on the



ventral margin of the genae. A crescent-shaped row of five small tubercles just at the base of the palps. Length of head from apex to edge of labium, 4 mm.; width, 3.5 mm.

Body, greenish straw yellow, marked with dark reddish-brown and chrome yellow. Sides of entire body covered with fine brown dots. First thoracic segment with a short transverse ridge, yellow, marked with two lateral brown spots. Two faint median dorsal brown lines on thorax II and III. Thoracic legs a light brown, a shiny black spot on the outer aspect of the second segment.

Dorsal portion of abdomen marked with one median light yellow line, with two parallel chrome-yellow lines on either side. Abdomen III with two dorso-lateral spots of deep brown. Abdomen IV with a median spot of same color, and abdomen V with a similar V-shaped marking. Two smaller median spots on abdomen VII and VIII. Lateral dark brown markings consisting of three pairs of stripes extending from the lateral line to the base of thoracic leg III, and pro-leg I and IV. The ends of all the pro-legs marked with the same color. A ventro-lateral spot on abdomen VII. With the glass may be seen a very sparse covering of fine hair. Total length 40 mm. Greatest width at segment IV, 5.5 mm.

A comparison of a second type shows a great reduction of the brown color. The general tone is lighter, eyes marked with an inner line of black and an outer of brown. No other brown on head or body except a small V on abdomen IV, and a sparse sprinkle of brown dots on the sides. End of feet and pro-legs black. The yellow markings similar to above, but lighter.

Mature Larva. Despite the fact that such a large amount of variation occurs in the intermediate larval stages, we find that the last stage before pupation is fairly constant as to the general color pattern. The body assumes a dull, dirty green color, and becomes short and thick. All of the brown, saddle-shaped markings are lost, the only trace of brown being a number of fine dots along the sides of the body, and in many instances even these are not present. As a rule, however, the brown is replaced by a dorsal band of white and two lateral bands of the same color. But little, if any, food is taken during this stage, the larva changing in a few days to the pupa.

*Habits of Larvae.* Our attention was first called to the depredations of this larva by Mr. Eliot C. Clarke of Boston, whose summer home is near Tamworth, New Hampshire. Mr. Clarke informed us that a vast colony of green worms had suddenly

appeared, stripping hundreds of acres of forest land in various sections of the Sandwich Range of mountains. Following Mr. Clarke's communication came numerous inquiries concerning the "green caterpillar," which was said to be sweeping the forest of all vegetation through the town of Tamworth. Within two or three days the mail of the Station Entomologist was practically doubled. For this reason a personal investigation was at once begun to try and determine the facts concerning the outbreak. In this work the greatest assistance was rendered the writer by Dr. Wm. Rollins, whose summer home is also near Tamworth.

In driving through the country one's attention was at once attracted by the vast tracts of brown woodland, broken only here and there by small clumps of pine trees. On the farm of Mr. Eliot C. Clarke, eight miles west of Tamworth, was one such-infested area which was carefully studied, and is quite typical of the section. The tract of land under consideration was located in the foothills of the Sandwich Range, at something over one thousand feet elevation, and was probably a mile or more in diameter. The timber consisted principally of maple, birch and beech, with a small variety of shrubs and other trees.

This region was very distinctly divided into three zones. The first, or central portion, comprised an area of several hundred acres, which was entirely stripped of all foliage. However, beside the conifers there was one peculiar exception, the striped maple or moosewood (*Acer pennsylvanicum*) was apparently unharmed, bushes in full leaf being in evidence in all parts of the forest. In this central area few, if any, larvæ were to be found, although I was informed that about a week earlier the rocks, trees and ground were literally covered with one great crawling mass of green caterpillars, but by the time I arrived nearly all of these had either starved or begun preparations to pupate. Just beneath the leaves were countless numbers in all stages of pupation. Probably a third of those attempting to pupate were so weakened by starvation that a complete transformation was impossible. Large numbers of partially formed pupæ were found dead, beside quantities of larvæ which had only reached the third stage, but were enclosed in their thin silken cocoons ready to pupate. This was undoubtedly caused by the entire lack of food, the partially grown larvæ taking refuge under the dead leaves.

The second zone varied in width from a few yards to several rods, and entirely surrounded the first. This zone was charac-



terized by countless myriads of larvæ in all stages of growth, as well as in all stages of starvation. The trees were not entirely denuded of foliage, but covered with larvæ which were rapidly completing the work. Everywhere was to be seen one vast crawling mass of green caterpillars, and the noise made by the falling excrement and bits of leaves sounded like an April shower. In the mountain streams bushels of caterpillars were collected in the eddies, their decaying bodies causing a decided stench. It was this crawling mass of caterpillars that gave foundation for the general impression that the larvæ migrated in mass from a stripped section of the forest to one where food was plentiful, something on the order of the army worm. A careful study was made of the problem with the result that no migration whatever could be detected, except what would accidentally occur from the worms crawling about. All of the larvæ observed were, technically speaking, negatively geotactic, that is, they had a tendency to crawl up any perpendicular object they came to whether it were a tree, rock, stump or weed. The fact that the larvæ were on the ground at all is explained by the countless numbers feeding on a tree at one time. In feeding, the larva eats out crescent-shaped areas from the leaf, frequently cutting off a considerable portion of it which falls to the ground, in many cases carrying the larva with it. In other instances as the foliage is stripped from the tree, the larvæ crawl to the outmost twigs in search of fresh leaves, and may be either blown off, or drop to the ground. These, starting out in any direction, are as likely to crawl up a pine tree as any other. Those larvæ not successful in finding food crawl about until, weakened by starvation, they fall to the ground again, only to repeat the search. In this way the infested region would be pushed farther and farther away from the original colony, but during the entire season could not be extended over much new territory. Even after the larvæ are ready to pupate it seems doubtful if they crawl down the trunks of the trees, but more likely simply drop to the ground. Beyond much question this second zone was made up of larvæ which had been fortunate enough to migrate in the right direction from the original infested area. On one side of this area was a pasture, which was searched for several hours, but no caterpillar could be found any distance from the trees. This fact, also, led me to further doubt there being a migration.

Extending for a mile, or more, on all sides of this badly infested zone was an area in which the larvæ were quite numer-



The antlered maple caterpillars assembled at the base of a tree. Tamworth,  
N. H., July 17, 1908.

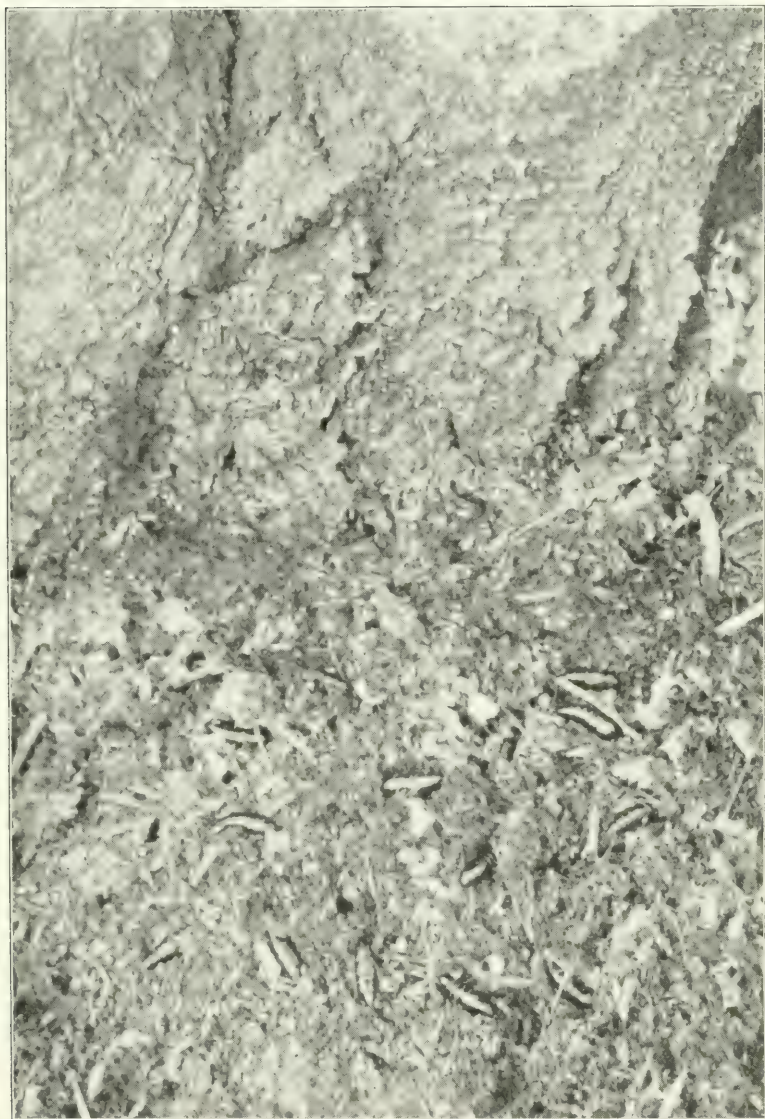




Antlered maple caterpillars among the leaves in a woodland. Tamworth,  
N. H., July 16, 1908.



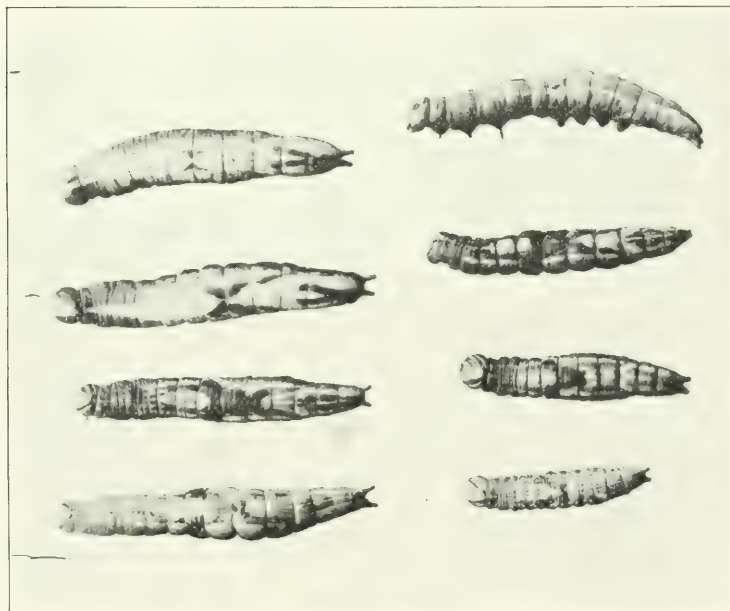




Pupae of the antlered maple caterpillars among the leaves at the base of a tree.

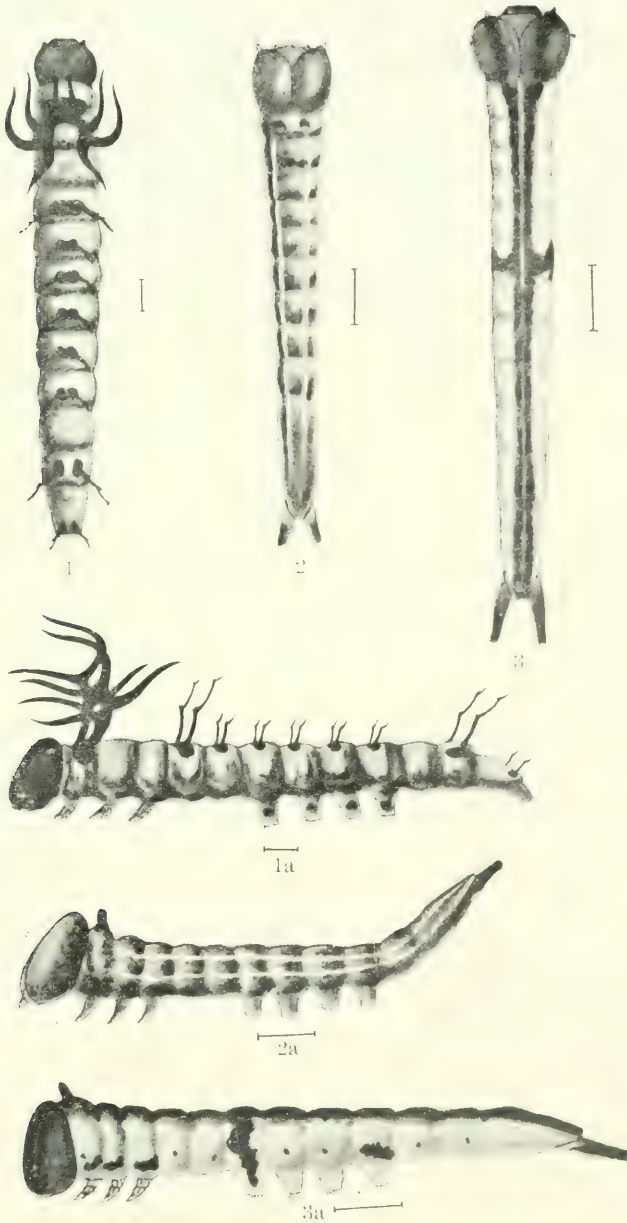






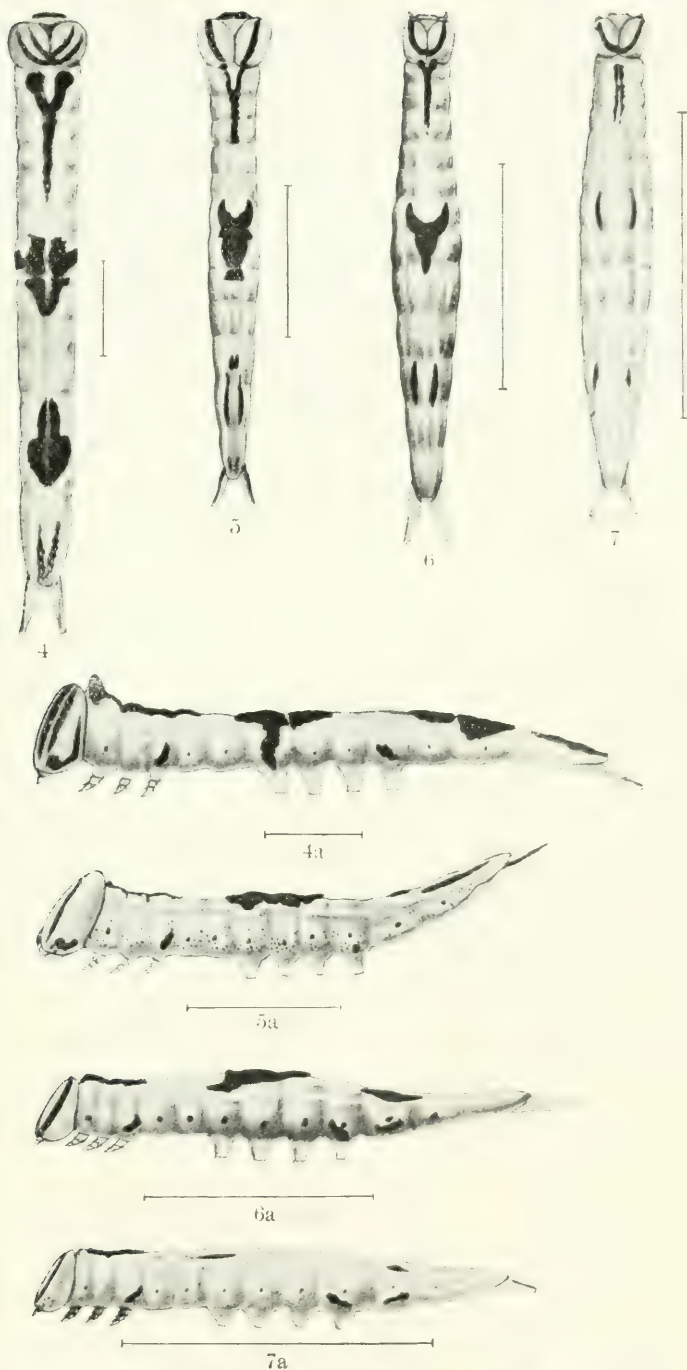
The antlered maple caterpillar, about natural size, showing the variations in markings.





The antlered maple caterpillar (*Heterocampa guttivitta* Walk.) Fig. 1. Stage I; 1a, side view. Fig. 2. Stage II; 2a, side view. Fig. 3. End of stage II; 3a, side view. (After Packard.)





The antlered maple caterpillar (*Heterocampa guttivitta* Walk.) Fig. 4. Stage III; 4a, side view. Fig. 5. Stage IV; 5a, side view. Fig. 6. End of stage IV; 6a, side view. Fig. 7. Stage V; 7a, side view. (After Packard.)







Woodland defoliated by the antlered maple caterpillar at Tamworth, N. H.,  
Aug. 4, 1908.





A little further in the woodland shown in plate 28, showing the work of the antlered maple caterpillar on maple, beech and birch.





Edge of woodland defoliated by the antlered maple caterpillar. Tamworth,  
N. H., July 16, 1908.





ous, but not at all conspicuous. In walking through the woods but few, if any, larvæ would be noticed. However, the ground was covered several inches deep in places with partly eaten leaves and excrement, which might be plainly heard constantly falling to the ground.

There seems no adequate explanation for this mode of distribution, although it was essentially the same in every locality studied. Possibly the central area may have been more or less seriously affected in past years, the outer area representing the extent of migration of the adults for one season.

Concerning the food plant, with one or two exceptions, but little preference is shown between various hardwood trees. Practically everything is taken with the exception of the "moose-wood." There is, however, a preference for maple and beech, while the white oak and yellow birch are left until the last.

In feeding the larvæ cling to the under side of the leaf, and, beginning at the outer edge, eat out large crescent-shaped areas. Frequently, two of these areas uniting will cause the outer portion of the leaf to fall. Whether or not the younger larvæ feed in colonies is not known, but the more mature forms do not appear to be gregarious in their habits.

When about ready to pupate the larvæ drop to the ground or let themselves down by silken threads, then work their way under the leaves to a depth of from two to six inches. It seems quite probable that the larvæ molt after leaving the trees, the form usually found beneath the leaves being quite different from the ones on the trees.

*Pupæ and Pupation.* After the larvæ have worked their way well beneath the leaves preparations are begun to enter the pupa stage. This is a very simple process as compared with the elaborate cocoons made by some of our moths. In this instance the larva works out a simple, small cell, but little if any silk entering into the composition. However, several larvæ kept in the laboratory worked their way beneath the dirt and spun quite firm cocoons, which were covered with particles of dirt held firmly together by silk threads, while the interiors were lined with silk and perfectly smooth. The length of time consumed in this preparation is not known, but the transformation takes place within a week or ten days after the larvæ leave the trees.

The pupa may be described as follows: Body stout and thick, head somewhat pointed, mesoscutum firmly corrugated, or nearly smooth, abdomen covered with slight depressions. Beside the mesoscutum are from six to ten quadrangular, flattened, unpol-

ished tubercles, each with a slight median depression. The two terminal spines of the abdomen have a very characteristic shape. Each ends in an enlargement resembling a foot with the heel pointing inward and the toe outward. Vestiges of the anal legs and genital openings indistinct. General color dark reddish-brown. The winter is passed in the pupa stage, but some of the moths emerge during the late summer or early fall. Whether a sufficient number come out to produce a second brood or not remains to be determined. Large numbers of pupæ were found July 20, so it seems quite probable there may be a small second brood.

*Relation to Other Heterocampae.* All the moths of this group look very much alike, there being a close relationship between not only the members of the genus *Heterocampa*, but also the adults of the entire family *Notodontidae*. There is much similarity in markings, as well as other details of structure. In a synopsis of the genera of the sub-family *Heterocampinae*, Packard gives the following distinguishing characters: "Fore-wings produced toward the apex, outer edge usually very oblique; a long subcostal cell, hind wings short and rounded, male antennae filamental at the end, larvæ varying from being simply nocturiform to having long substenapodiform anal legs." Of the seven genera which constitute this sub-family none are well marked, grading off almost insensibly into one another. The usually short hind wings with their well-rounded apices, the broad stout palpi, and the very hairy thorax, are apparently the chief characters.

Twelve species belong to the genus, all with very similar markings, but in *H. guttivitta* the markings are less distinct than usual, the fore wings ash-gray, and, according to Packard, usually a discal mark, enclosed in a large diffuse lunate pale ashen patch. The latter mark, however is not always distinct.

The closest allied form of this particular species is *H. biundata*. On casual examination these two forms appear almost identical. But all the specimens studied of *H. biundata* have two definite brownish scallop-shaped bands crossing the base of the fore wing which are either very faint or entirely lacking in *H. guttivitta*. The general coloring of *H. biundata* is lighter, with a yellowish tinge, while the markings are much more distinct, the wings and the thorax are marked with a deeper brown than in *H. guttivitta*. The larva of *H. biundata* has a more pointed head than *H. guttivitta*, and lacks in the early stages the horns as well as the brown saddle-shaped mark, although a brown spot is usually present on the side of the body.

## ASSOCIATED CATERpillARS.

Two other forest insects which have been closely associated with *H. guttivitta* in the present outbreak, should be described here. One of these is known as the Striped Maple Worm (*Anisota rubicunda* Fab.). The adult worm is about two inches long, light green in color, with white stripes down the side. It may be easily distinguished from the preceding species by having at all stages of its growth two large black spines just back of the

head, and a series of shorter spines along the sides of the body. This is by no means an uncommon maple pest, but seems to have been more abundant, than usual, this year. In the valleys and the more level sections of the state this insect has caused more destruction than *Heterocampa*, especially to shade trees. However, the defoliation has in no case been so complete.

Another serious pest during the past summer was the Spiny Oak caterpillar (*Anisota stigma* Fab.) This worm resembles the preceding very much, but is of a dark brown color. This is a well known pest of the oak, but has been somewhat more numerous this summer than usual.

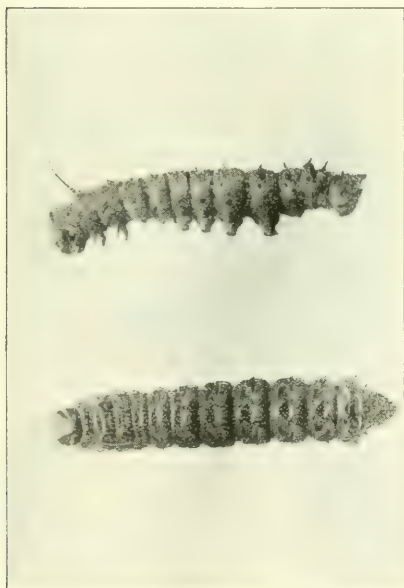


FIG. 43. The Spiny Oak caterpillar (*Anisota stigma*), natural size.

## EXTENT AND CAUSE OF OUTBREAK.

The amount of damage caused by the attack of the Antlered Maple Caterpillar has already been suggested. Thousands of acres of woodland in various parts of the state have been entirely stripped of foliage, and other tracts more or less injured.

Several trips have been made by the different members of the entomological staff to the most seriously infested region. Mr. W. M. Barrows on Aug. 14 visited the region lying between Lake Winnepesaukee and Lake Sunapee. In his report Mr. Barrows states that the maples in this section were badly stripped, but the basswood, ash, oak, etc., were not badly eaten. All of the larvæ at this time were in the pupal stage, so it was not possible, in all cases, to tell whether the work was that of *Heterocampa* or *Anisota*, although numbers of *Heterocampa* pupæ were found particularly under maple. Numbers of mice were found working at the same level as the pupæ, many of which were destroyed. Upon inquiry it seems that mice have been very scarce through-

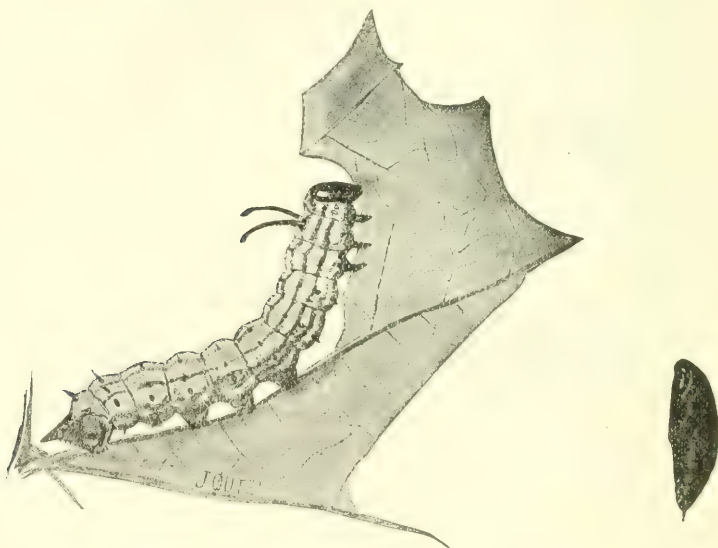


FIG. 44. The Striped Maple Caterpillar (*Anisota rubicunda*). (After Felt).

out this section within the past two years. It was also learned that the last winter was severe for the mice in many respects. There was very little snow but considerable ice, while the frost was very deep, and it was thought that the mice were killed off by the very severe winter or some other cause.

Birds are also extremely scarce, as on driving from Grafton to Bristol, a distance of fourteen miles, Mr. Barrows reports only having seen "one robin, one song sparrow and two large hawks,

there being no swallows, king birds or other insectivorous birds."

On Aug. 18, Mr. W. S. Abbott investigated the region in the towns of Sullivan, Keene, Hancock, Peterboro and the intervening region. Through this section he found the maples, birch, beech and ash badly stripped, the maple and beech being taken first. No larvæ or adults were found, but the pupæ were abundant in the leaves. In Sullivan was a wood lot of about a hundred acres which was badly stripped. In this region many parasites were found, about one-fifth of the pupæ being broken open. In one case specimens of *Calathus gregarius* were found feeding on freshly broken pupæ. Carabidæ and carabid larvæ were rather plentiful among the dead leaves. At this place predaceous enemies were more numerous than in any other locality. Many of the maples which had not been entirely stripped by *Heterocampa* were being attacked by *Anisota rubicunda*. At Peterboro on the farm of W. C. Abbott was a row of maples which had been badly infested, but an early spraying with arsenate of lead had killed the worms, and the trees appeared uninjured.

Earlier in August Prof. E. Dwight Sanderson visited Tamworth, extending his trip up to Intervale and through the White Mountain region. From his observations the larvæ were not destructive in the White Mountain region proper, the last serious infestation being at Intervale.

On July 20 the writer visited Tamworth and vicinity, the results of which form the basis of this paper. Later in the season, Aug. 11, a trip was made through the towns of Sutton and Sunapee, southward through the intervening towns to Bradford and Henniker. In Sutton the work of *Heterocampa* was not so much in evidence except in two or three places. At South Sutton, in particular, were several hundred acres which were entirely stripped. However, there were but few hard-wood trees which had escaped the attack of this insect, the pupæ of which could be found in small numbers buried beneath the leaves. In the town of Sunapee in the region lying nearer the lake the larvæ of *Anisota rubicunda* were quite numerous, while but few *Heterocampa* pupæ could be found. Through the towns of Goshen, Newbury and Bradford were many large tracts of hard wood completely stripped, though there is no doubt but that *Heterocampa* was greatly assisted in this by *Anisota rubicunda* and *Anisota stigma*, as these larvæ were quite numerous everywhere. Through the towns of Warner and Henniker the work was still less evident, there being but few patches entirely defoliated.



It is hardly probable that the attack this year will prove fatal to many of the trees, but if renewed another season many of the trees will, beyond a doubt, be seriously injured or killed. Numbers of the maple groves that were defoliated early in the season sent out a second growth of leaves, but these would assist very little in the nutrition of the trees.

New Hampshire is by no means the only state that has suffered from the attacks of *H. guttivitta* this year, Maine, Vermont and New York having all had serious outbreaks.

So far we can only conjecture as to the cause of the apparently sudden outbreak. It seems probable that these worms have been multiplying for some time, but have been so well protected in the dense forests that their presence has not been detected. On the other hand, there seems little doubt that the species has been held in check by parasites, or other natural enemies, which for some reason were unusually scarce this season, allowing the caterpillars to multiply abnormally. During the entire summer, in which large numbers of larvæ were reared in the laboratory, but one species of parasite was found (an *Ichneumon*) and that occurred in only two larvæ. Usually half the larvæ of our moths and butterflies which reach any size in the open, will be found to contain parasites. According to Miss Edith Patch of the Maine Agricultural Experiment Station, *Ichneumon sublatius* was quite numerous this season in Maine. This is probably a natural parasite of *Heterocampa*, which for some unknown reason became very scarce, allowing the host to multiply to such an appalling extent. Of the predaceous insects but two were at all numerous. The Fiery Ground Beetle, (*Calasoma calidum*), was quite plentiful in different parts of the state. This large bright-colored beetle doubtless destroyed great numbers of the caterpillars, but in the worst infested regions the beneficial results were not very apparent. The other predaceous insect, one of the soldier bugs, *Podissus placidus*, far outnumbered the ground beetles, and might be seen busily sucking the juices from the larvæ in almost any infested area.

Another factor in the outbreak was the noticeable scarcity of birds of all kinds. Not that this was the prime cause for such large numbers of caterpillars, but their numbers would evidently have been greatly reduced had there been more birds in the woodland. In many sections of the infested region one would travel all day, and not find half a dozen birds of any description. As before stated, Mr. W. M. Barrows in driving from Grafton to Bristol, a distance of fourteen miles, reports having

seen but one robin, one song sparrow and two large hawks, and the writer in traveling from Bradford to Henniker, a distance of ten miles, saw only four sparrows and one black-bird. But few or no birds were present in the badly infested region of the Sandwich Range.

Again, the ground mice and shrews do much toward holding these insects in check. Judging from the habits of these little animals they destroy many of the pupæ during the winter months. Mr. Barrows reports having found large numbers of empty pupæ cases in their burrows. The general opinion seems to be that the mice have been unusually scarce during the past few years. Still, we have no absolute data on the subject.

Weather conditions, in a general way, may have had considerable influence on the outbreak. If a combination of weather conditions existed which was detrimental to the parasitic or predaceous enemies of *Heterocampa*, but on the other hand was not beneficial to the species itself, a noted increase would naturally result. That climatic conditions were more or less responsible seems to be indicated by the peculiar local distribution. In all cases personally observed, the most serious outbreaks have been at elevations of from eight hundred to a thousand feet. Frequently a very definite line could be drawn on the mountain-side, above which the trees were completely defoliated, and below which there was no perceptible injury. However, we can only guess as to what extent this was dependent upon climatic conditions.

Many of the larvæ were found diseased, but no large proportion were thus destroyed. It is quite possible that diseases may be an important factor in the natural control of the pest. If so, the very unusually dry summer of 1908 would have effectually checked the development of such diseases and thus permitted the abnormal increase of the caterpillars. But little can be predicted for the future until more is known of the habits, life history, and natural enemies. The probability is that the enemies will multiply sufficiently within a short time, to keep the larvæ in check, but if this does not occur the results are liable to be very serious.

#### GEOGRAPHICAL DISTRIBUTION.

The range of the Antlered Maple Caterpillar is in no way restricted to New England, it having been reported from Maine, New Hampshire, Massachusetts, Rhode Island, New York, Wash-

ington, D. C., Georgia, Iowa, Wisconsin, Florida, Maryland and Colorado.

Within the state of New Hampshire letters have been received from widely separated points, indicating a general distribution. The worst infested region seems to commence on the eastern slope of the White Mountains in the town of Bartlett, and extends southward, including Conway, Albany, Tamworth, Sandwich, the towns bordering Lake Winnepesaukee to Plymouth, and lying between that lake and Lake Sunapee, extending on south to Sullivan, Keene, Hancock and Peterboro. The three principal centers of infestation seemed to be Tamworth, Sutton, and Hancock or Peterboro. Between these centers the towns were more or less seriously infested, especially in the more rugged country, where, in fact, the greatest amount of damage has occurred. In but few instances was the damage very extensive below one thousand feet elevation. It must not be inferred from the above that the larvæ are only found in the localities mentioned; they have been found at Durham, and possibly occur in limited numbers throughout the entire state.

Some idea of the distribution and food plants may be had from the following partial list of correspondents:

- July 11-20, '08. Tamworth, (numerous letters). Reported on:  
Maple, birch, beech, apple; less numerous on  
oak, wild cherry, poplar, butternut, gray birch.
- July 15, '08. Snowville.—Apple.
- July 15, '08. Chocorua.—Maple, birch, apple.
- July 15, '08. Plainfield.—Beech, maple; less numerous on birch,  
oak, basswood.
- July 17, '08. New London.—Apple.
- July 18, '08. East Conway.—Birch, beech, maple, oak, apple.
- July 20, '08. Greenhill.—Apple, maple, beech.
- July 20, '08. Pequaket.—Beech, white oak, birch, rock maple,  
white maple; less numerous on ash, poplar.
- July 21, '08. North Weare.—Hard wood.
- July 21, '08. Madison.—Poplar, beech, apple, maple.
- July 22, '08. Bristol.—Maple, oak.
- July 22, '08. New Durham.—Beech, yellow birch, white birch,  
rock maple.
- July 23, '08. Intervale.—Beech.
- July 24, '08. Whiteface.—Hard wood.
- July 24, '08. Ossipee.—Hard wood.
- Aug. 3, '08. Plymouth.—Hard wood.
- Aug. 3, '08. Sullivan.—Maple.
- Aug. 4, '08. South Sutton.—Maple.
- Aug. 7, '08. Middleton.—Maple, oak, beech, elm.

Aug. 10, '08. Elkin.—Hard wood.

Aug. 23, '08. New Hampton.—Maple, birch.

It is interesting to note that the outbreak in New Hampshire seems to be simply an extension of the infested region in Maine. According to the Circular of Information issued by E. F. Hitchings, State Entomologist of Maine, the attack has extended to the north and east from the Ossipee valley, including the towns of Bethel, Brownfield, Bridgton, Auburn and Fairfield, as well as numerous other localities in this region.

#### METHODS OF CONTROL.

At present it seems almost useless to try to suggest any means of eliminating this pest from the vast forest areas which have become infested. The problem, however, is much more simple with shade and orchard trees where proper means of control are adopted.

The simplest and surest method is spraying, using an ordinary barrel spray pump and plenty of hose, so the operator may climb up in the tree, and be able to spray the outer and topmost branches.

The best arsenical spray for this purpose is the arsenate of lead, from three to five pounds per barrel of water. This will probably prove most effective if applied as a mist spray, the spray being thrown from the body of the tree outwards against the under side of the leaves. There are two reasons for this: First, a rain is less liable to wash off the poison from the under side of the leaves; and, secondly, the larvæ feed from the under side. In spraying for *Heterocampa* care must be taken to thoroughly drench the topmost branches, as the larvæ will be found there. From what is known of the life history, the spraying had best be done between the first and middle of July. The worms at this time may not be very much in evidence, but still may be easily detected.

As a further preventative the trees may be banded with sticky fly paper or tanglefoot, or building paper smeared with a thick layer of printer's ink, to prevent any larvæ that may fall to the ground from crawling up the trunks. This is particularly advisable if the sprayed trees are near a woods or other infected trees, which may not be sprayed.

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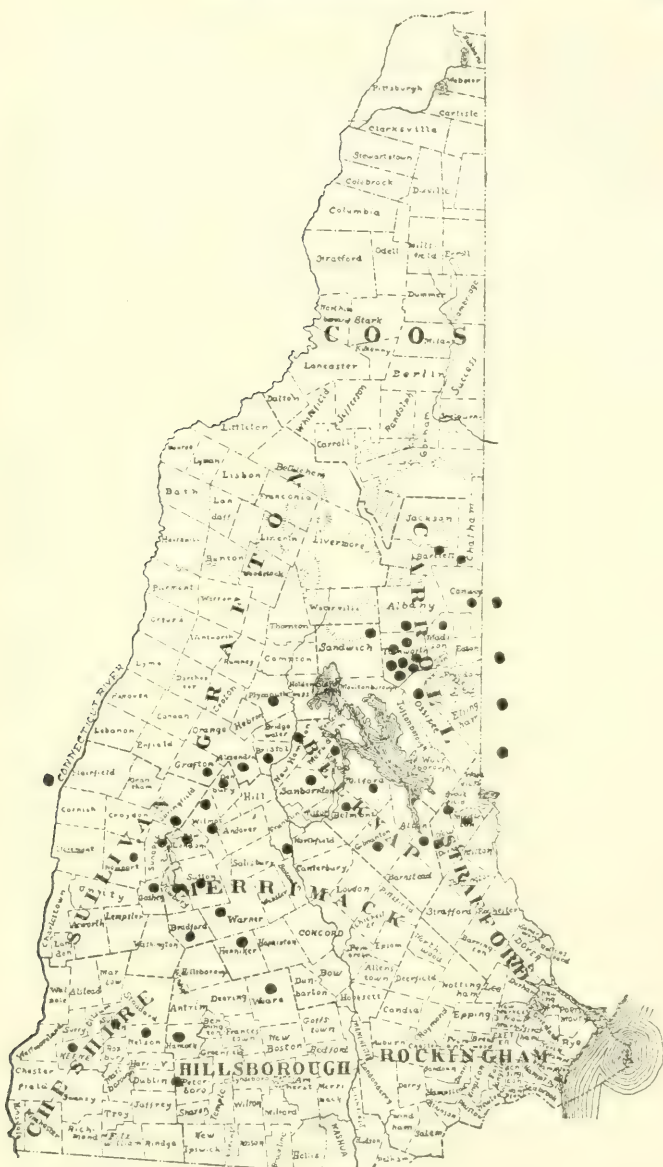


FIG. 45. Map showing distribution of the Antlered Maple Worm in New Hampshire in 1908.

The species was injurious at the black dots.



## REPORT OF THE DAIRY DEPARTMENT.

FRED RASMUSSEN.

The following is a brief report of the work of the Dairy Department from September 1, 1907, to November 1, 1908:

The dairy herd, not being under the supervision of the Dairy Department, the work of this department is confined principally to the manufacture and marketing of dairy products. As the department at present is practically without facilities for doing experimental work, its work during the last year has been of an educational, rather than experimental nature.

## DAIRY SURVEY.

The principal object of the dairy survey is to make a study of the conditions of the dairy industry in the state in order to ascertain the difficulties and problems the farmer meets in the production, manufacture and marketing of milk, cream and butter. The information gathered is to be used as a guide in planning and carrying out experimental work, the result of which would be applicable to New Hampshire conditions.

Furthermore, a study of the existing conditions in the state will be a great help in answering adequately the many letters of inquiry received in regard to dairy matters, as well as to furnish much timely material for lectures on dairy topics for which frequent calls are received.

In order to get a general idea of the conditions in different sections of the state, the co-operation of the Granges was asked for to the extent of giving names of farmers making butter and selling cream and milk. A circular letter enclosing return postal was sent to 286 Granges. On May 30, 1908, 83 letters had been received. June 1st a follow-up letter was sent to the 203 Granges from which no replies had been received, resulting in 60 answers. In all, 142 Granges, or, 50 per cent., answered the correspondence.

The cards received from the Granges contained 551 names of farmers making butter, 196 names of farmers selling cream and 74 names of farmers keeping records of their dairy cows. The cards also contained information in regard to the demand for dairy butter, prices paid for same and whether there was an increase or decrease in the production of dairy products in the

community. Reports from 140 towns were received. Forty-four showed an increase, 27 reported conditions normal, while 37 reported a decrease in the production of dairy products. The price of butter varied from 20 to 35 cents with an average price of 28 cents per pound. One hundred and twenty-five towns reported a good demand for farm butter, while 15 reported demand as limited.

A circular letter, explaining the object of the proposed dairy survey, was sent each of the 921 farmers whose addresses had been retained. The letter contained a return postal with questions in regard to the extent of their business, method of handling and disposing of the product, and the desirability of the farmer having a representative of the station visit his farm. Nineteen per cent. answered the questions on the enclosed postal.

After having obtained, through correspondence, a general idea of the dairy conditions in different sections of the state and also having had from several farmers in each section an expression of willingness to co-operate with the station, work in the field was begun.

To assist in this work the services of Mr. John Daniel, a graduate of Massachusetts Agricultural College, were secured. Over 100 farms have been visited. Information has been gathered on methods of dairy farming and farm butter-making, and other dairy problems. In order to make a through study of the farm butter-making problem, the representative of the station carried with him a small Babcock test so as to get complete records on the yield and losses in butter-making under farm conditions.

Numerous demonstrations have been given in testing milk and cream with the Babcock test. As far as possible the samples tested were chosen, so as to show the practical bearing of the test on the daily operations.

To find a loss of 1.5 per cent. fat in a sample of buttermilk, or to find a cow that supposedly tested very low, test 6 per cent., or to find a man selling cream guaranteed to contain only 40 per cent., which tested 47 per cent., making a difference in his daily net income of \$2.53, are results which can not help impressing upon the farmer the value of and economy of the Babcock test as a part of his dairy equipment.

Demonstrations have also been given in the scoring of dairy barns and dairy methods, using the score card recommended by

the Dairy Division, Bureau of Animal Industry, U. S. Dept. of Agriculture.

The work of the dairy survey has been encouraging, as much valuable information has been gained, as well as ideas for future work. Although a few men have been visited who did not appreciate the work of the Experiment Station, the great majority have shown a great appreciation of the work and have been very eager to gain new ideas and to accept such suggestions for improvement, as it seemed advisable to offer.

There is a desire on the part of most of the people to be in close contact with the work of the Experiment Station, a desire for more personal contact, as indicated by frequent inquiries as to the possibility of the station, also, giving demonstrations with spraying, or conducting fertilizer tests.

#### LECTURE WORK AND CORRESPONDENCE.

Since Jan. 1, 1908, fourteen lectures on dairy subjects have been given at Granges or other meetings. The total number of people addressed being 776. This does not include the lectures given in connection with the demonstration at the Concord and Rochester fairs, nor the small gatherings which have been addressed in connection with the work of the dairy survey.

Besides the routine correspondence of answering inquiries, much additional correspondence has been carried on this year in connection with the dairy survey. Approximately 1800 letters have been sent from this department during the year.

#### NEW HAMPSHIRE EDUCATIONAL BUTTER SCORING CONTEST.

In order that the Experiment Station might become familiar with the quality of the butter made in New Hampshire creameries and the method employed in its manufacture, efforts were made to start an educational butter scoring contest. Such contests have been carried on successfully in other states, and have proven a great benefit to the participants.

A personal letter explaining the benefits of an educational scoring contest, with a plan for carrying out the work, and twenty questions to be answered, were sent to the buttermakers and managers of the 48 creameries which were supposed to be in operation in the state. Seventeen creameries replied, five of which had stopped operations. Three were shipping cream to

Boston, three answered the questions but did not signify their intention of taking part in the contest, and six were in favor of the contest.

The answers to inquiries sent the buttermakers revealed that few records are kept of the dairy work in the creamery, that in several creameries cream for testing was measured instead of weighed, that in one instance milk and cream was still bought for a certain price per pound without regard to the quality. None of the creameries made water determinations of their butter, and the over-run was too low. All of these factors are of great importance in good creamery management and consequently to the success of the creamery.

From the difference in method employed in the manufacture, it would be expected that the percentage composition of New Hampshire butter would vary considerable. To obtain accurate information on this point, ten samples of butter were collected at the exhibit at the Dairymen's meeting at Whitefield, N. H., representing ten creameries in different parts of the state. The samples, upon chemical analysis, showed the following composition:

No.	1	2	3	4	5	6	7	8	9	10
Water	15.62	13.35	12.33	12.16	12.09	11.54	10.75	8.33	8.13	7.22
Fat	78.88	82.51	82.70	82.75	84.80	83.60	85.65	87.12	88.18	88.41
Casein	1.34	2.80	1.73	3.32	1.33	1.59	1.81	1.03	1.50	1.64
Salt	4.16	1.34	3.24	1.77	1.78	3.27	1.79	3.52	2.19	2.73

The lowest, highest and the average percentage composition is as follows:

	Lowest	Highest	Difference	Average
Water	7.22	15.62	8.4	11.25
Fat	78.88	88.41	9.53	84.38
Casein	1.03	3.32	2.3	1.80
Salt	1.34	4.16	2.82	2.57

An average water content of 11.25 per cent. is below normal, as compared with analyses from other states. The average water content of 221 samples, as analyzed by the Iowa Station was 13.21 per cent. An average fat content of 84.38 is not as high as would be expected with as low a water content. This, however, is due to a higher per cent. of casein and salt than is normally found in butter. Analyses made of 28 samples of butter entered in an educational butter scoring contest in South Dakota at the same time of the year, showed the average casein content of this butter to be 1.18 per cent., and salt content 1.67 per cent., which is 34 per cent. less casein and 35 per cent. less salt than is found in New Hampshire butter.

In further looking up the creamery industry it was found that several of the creameries from which no reply had been received, had either failed or changed from a buttermaking plant into a skimming station, shipping cream to Boston. Several creameries in the state have been bought by the milk contractors in Boston, and are operated as skimming stations.

As the success of a scoring contest is dependent upon the interest shown by the creameries, it can readily be seen that after finding so many of the creameries had either failed or changed into skimming stations, that it would be impossible to get entries enough to carry on a successful contest, and the project was therefore given up.

The many failures and changes in the creamery industry in New Hampshire are primarily due to the increasing demand from the cities for milk for direct consumption. It is very difficult for a creamery to pay the prices for milk offered by the contractors unless a special price is obtained for the butter and the creamery has the best management. Some of the creameries failed because they were too small, making the cost of manufacturing a pound of butter too high. A report from one creamery showed the cost of manufacturing to be 7 cents per pound of butter made. A lack of co-operation on the part of the farmers, as well as poor management, are also factors which have had much influence in the changes in the creamery industry.

#### HERD TESTING.

In order to stimulate the increasing interest in the improvement of dairy herds, and to obtain information in regard to methods of feeding and cost of production, the Experiment Station offered to test, free of charge to the New Hampshire dairymen, a limited number of dairy herds. Twelve herds, numbering 193 cows, are now being regularly tested by the Experiment Station, records being kept, not only of the amount of milk and butter fat produced, but also of the amount and cost of food consumed.

The following comparison will show the great variation in the cost of producing milk between two herds in February, having a proportionate number of fresh cows:

	Herd No. 1.	Herd No. 2.
Average cost of keeping a cow per day.....	26.3c	20c
Cost of producing milk per can. ....	32.5	21
Selling price per can. ....	34	31.5
Profit per can. ....	1.5	10.5



The loss sustained by Herd No. 1 is attributed to the following causes: (1) The breed of cows was better adapted for making butter or selling cream than for selling milk. (2) No study was made of individual cows in the herd. Some cows were fed too much grain, others not enough for a profitable production.

As soon as a year's work is completed the results will be published in bulletin form, giving practical suggestions on the improvement of the dairy herd.

#### TESTING PURE BRED COWS.

Requests have been made from several breeders of Guernsey, Jersey, Holstein and Ayrshire cattle, for the supervision of the Station in conducting weekly or yearly tests of their animals under the rules of their respective associations. During the last year there has been completed 15 Guernsey and 5 Holstein tests. Seven Ayrshires and two Guernseys are under test at the present time.

#### BULLETINS.

As soon as the work carried on at the present time is completed, the following bulletins will be published:

1. Report on the Dairy Survey.
2. Farm Buttermaking in New Hampshire.
3. Herd Testing.

#### EXECUTION OF DAIRY LAWS (ACT OF 1901).

The act demands that any person who operates the Babcock test, or, any other test, for determining the butter fat or solids in milk and cream, as a basis for apportioning the value of same, must hold a certificate from the proper station official showing the holder competent and well qualified to perform such work. The law, further, provides that all glassware used in connection with the testing must be tested for accuracy of graduations.

During the last year 33 candidates have been examined for a milk testing certificate. Two failed, while it was necessary for several to take a second examination.

Sixteen hundred and thirty-six pieces of glassware were examined for accuracy of graduation, of which 41 pieces, or, 2.5 per cent., were inaccurate or defective.



## NEEDS OF THE DEPARTMENT.

The old college creamery has for several years been entirely inadequate, both for the needs of the college and station work. The department is very much in need of a Dairy Bactriologist and a laboratory for research work. At the present time the department is unable to get bacteriological work done, which greatly handicaps the work, as in a state like New Hampshire, where the production of milk for direct consumption is the main branch of the dairy industry, bacteriology, necessarily, plays the greatest importance in solving timely problems.

In all expermental work with dairy products, as well as in the study of dairy bacteriology, one of the most important factors is to be able to control and regulate temperatures. It would, therefore, be of the utmost importance to the experimantal and research work of the department, to have suitable cold storage facilities.

The importance of the dairy industry in the state warrants that a proportional part of the funds appropriated for this station be used for work along dairy lines. In order, however, to make use of the money, the department must be provided with suitable quarters and facilities, and it is hoped that the appropriation for the proposed new dairy building may provide for a dairy research laboratory and a system of artificial refrigeration.

## REPORT OF THE DEPARTMENT OF HORTICULTURE.

B. S. PICKETT.

I have the honor to submit, herewith, my first annual report as Horticulturist in the New Hampshire Experiment Station. Since appointment to this position dates only from July 1st of the present year, my report is necessarily brief. The work in progress on my arrival has been continued throughout the season. The only new experiment inaugurated since July 1st, and completed, is one which I have reported briefly under the heading, "Experiment in Packing Apples."

It is proposed to reduce considerably the number of experiments conducted by the department and to concentrate attention and money on the solution of a few problems at a time.

### VEGETABLE GARDENING.

The greater part of the horticultural grounds, that could be reasonably tilled at all, was devoted to the growing of vegetables. Extensive tests were made of varieties of lettuce, beans, and peas. A valuable piece of work, looking to the publication of a monograph and classification of varieties of lettuce, resulted from the first of these tests.

### PLANT BREEDING WORK.

Many crosses between varieties of squashes, tomatoes and cucumbers, and some between varieties of corn, were tested. From these one valuable cucumber for greenhouse forcing has been obtained. This variety, which we call Granite State, is well established and will be offered to the public as soon as a sufficient quantity of seed has been obtained. Some excellent squash and tomato crosses also appeared, but these are not sufficiently fixed in type to be recommended as yet.

It is proposed to reduce the number of kinds of vegetables to be used in the breeding work, to concentrate time and money, on squashes and tomatoes, and to emphasize the scientific value of the records rather than the securing of new varieties of commercial importance. It is also desirable that the data already accumulated be put into shape for reference or publication; and to preserve this valuable material and carry forward the breeding projects proposed, it is necessary that a specialist be obtained who can devote his entire time to this work.

## VEGETABLES UNDER GLASS.

Several vegetable crops have been grown under glass. These were, however, planted to increase the quantity of seed from certain crosses and selections of cucumbers and tomatoes, and to test some new varieties of muskmelons. Incidentally, from these tests, we found that muskmelons did not yield a profit under glass, but that cucumbers, grown at the right season, were very profitable. Two bushel boxes containing 40 and 42 cucumbers, respectively, brought \$3.50 and \$4.50 on the Boston market the last week in September. All other cucumbers were kept for seed but the quantity was sufficiently large to have yielded a handsome return, had they been sold in a commercial way.

## FRUIT GROWING.

I found the condition of the fruit grounds generally deplorable on my arrival here in July. In the young college orchard, (Thompson orchard, as it was designated), planted 8 years ago, very few of the original trees remained, and the replants varied in age from one year to five or six years, showing that replanting had probably been necessary every year. In this orchard we have undertaken to inaugurate a system of cultivation. With considerable difficulty the ground was plowed, some of the rocks removed, and a cover crop sown. It is intended that a first-class orchard be grown where the trees now stand, with the object of demonstrating the commercial feasibility of modern methods of orchard management applied to comparatively rough New Hampshire farm lands.

Woodman Orchard. This orchard, rented for experimental purposes, under the Adams Act, having in view studies of the causes and control of the alternate bearing of Baldwin apples, has been cleaned, pruned and cultivated and given every chance to recover from the damage done by the freeze of 1906-7. The crop was very light this year, the returns being about 30 barrels. I have pleasure in reporting, however, that it is now in first-class condition and will, with a reasonably favorable season, give us good experimental material another year.

Experiment in Packing Apples. The McIntosh apples in two orchards in the town of Deerfield, were purchased with a view, to obtaining fruit to be packed in different ways. It was hoped to obtain a considerable quantity of box fruits, but an attack of late apple scab left the apples very slightly specked and not quite satisfactory for boxing. It was decided, therefore, to

pack them in barrels according to well defined grades and honest packs throughout. The No. 1 apples were shipped to three commission men in Boston. From two of these returns of \$3.00 per barrel were obtained and from the third \$4.00 per barrel. No. 2 apples, shipped to a fourth party, brought \$1.75 and \$2.00 per barrel. Two bushel boxes of perfect fruits that were obtained, were sold at \$2.00 per box, or, at a rate equivalent to \$6.00 per barrel. One careful spraying, late in the season, would have doubled the value of the apples in these orchards—\$450 instead of \$225 on the market.

## PRESS CIRCULAR No. 1.

## ALFALFA FOR NEW HAMPSHIRE.

The New Hampshire Experiment Station has had many inquiries during the past three or four years about the growing of alfalfa in the state. Up until the present time we have advised against the expenditure of very much time, labor or money by the farmers in trying to grow the plant, because in our experiments we could not secure what would be called a reasonably good stand. After repeated trials, however, in which various methods have been used, we have met with a degree of success which seems to warrant a recommendation for alfalfa to the farmers of the state. It is for the purpose of stating, in brief, our experience with the plant and giving some timely suggestions regarding it, that this is written.

**CAUSES OF FAILURE:** The most common causes of failure are, seeding the wrong time of year; choking out by weeds or by nurse crop; poor drainage; poor seed bed; inferior seed; unfertile soil and a lack of lime.

**TIME OF SEEDING:** In our earlier attempts we plowed the ground as early as possible in the spring, and after thorough harrowing sowed the seed with oats or barley and covered it with a weeder. Failing to secure a stand, we began a series of later seedings, and found them much better. Seed sown from the 20th of July to the 10th of August gave a good stand in every case, other things being equal. This date is early enough for the plants to get a good start and become well rooted before winter sets in.

**CHOKING OUT BY WEEDS OR NURSE CROP:** Our greatest difficulty with all the early seedings and to a slight extent, with the later, was the choking out of the tender plants by the more rapidly growing nurse crop, or, when no nurse crop was used, by the weeds. By seeding about August first, just after a rain, if possible, the weeds are not likely to give much trouble, and the alfalfa will make a quick growth. It is best to sow the seed on ground which is practically free from weeds, preferably on that which has been cultivated for several seasons previously. As regards the nurse crop, it may be said that we have found it of no advantage for the early seeding, and for the late it is not necessary.

**DRAINAGE:** Alfalfa is naturally a deep-rooted crop and for that reason requires a deep, well-drained soil. If the natural drainage is not good the land should be tilled. It is a waste of time and money to try to grow alfalfa on wet land or on that

where ledges come within two or three feet of the surface. Winter killing is very apt to result if the land is not well drained.

**PREPARATION OF SEED BED:** Red clover may be sown on most any kind of a seed bed, but alfalfa must have one carefully prepared. There are many ways to do this, but the method we are now using, and would recommend, is as follows: If a stubble field, manure and plow about June first. Harrow every week or ten days until the date of seeding. The harrowing will keep all weeds in check and will give a well-firmed seed bed with a loose, finely pulverized mulch. By keeping the land clean and stirred, the nitrates will develop rapidly and will be ready for use by the plant when it begins its growth. If a pasture or hay field is to be seeded, apply a liberal coating of manure and plow just as soon as the hay can be cut. Then disk harrow, roll and harrow again until the ground is thoroughly pulverized. Some chemical fertilizer, especially nitrogen, may be used in this case to supplement that removed by the hay or grass.

**KIND OF SOIL:** Our experience indicates that the kind of soil is immaterial, provided it is well drained, fertile and free from weeds. The ends of our alfalfa strip are heavy clay, the middle is sandy loam and between the two loam. The alfalfa this year has been equally good on all three types of soil.

**KIND OF SEED:** Too much emphasis cannot be placed upon securing good seed. It is always best to buy by samples and then make a germination test and an inspection for weed seeds, before purchasing in bulk. If you can not make the tests yourself, send them to the Experiment Station and we will make them for you. Good seed should be plump, free from weeds, brown or shrunken seed, and of a greenish-yellow color. Northern or northwestern grown seed is best for this latitude because it will withstand the climate better.

**LIMING:** Alfalfa will not grow in a sour soil, and if there is any doubt about the soil being sour, it is best to use lime. This may be applied at the rate of 1000 to 2000 lbs. per acre, preferably a month, or more, before the seed is sown. It is immaterial in what form the lime is applied, although the ready prepared agricultural lime is the easiest of application.

**INOCULATION OF SOIL:** It is a generally accepted principle that alfalfa will not grow where the proper organisms are lacking in the soil. The presence of these germs is shown by the little nodules on the roots. In many cases enough of



the germs are sown with the seed to make the inoculation, but the most certain method is to inoculate with soil from an old alfalfa field or from a patch of sweet clover. The soil may be purchased from various alfalfa growers and scattered at the rate of 100 to 200 lbs, per acre.

**SOWING THE SEED:** The seed may be sown broadcast, either by hand or with a seeder, at the rate of 15 to 25 lbs. per acre. It should be covered lightly with a weeder or spike-tooth harrow. Roll the ground just before seeding rather than after.

**CUTTING AND MAKING:** If the seed is sown about August first the plants will attain a height of 12 to 15 inches and the roots about the same length, before freezing down. The plants should not be cut off in the fall unless the weeds threaten, and then all trash should be raked off as the young plants are very easily smothered. Cut the alfalfa the next season as soon as one-fourth of the plants have blossomed. When the hay has wilted, cock and allow to cure. Handle carefully to preserve the leaves, since they are as valuable for feed as wheat bran. In about six weeks after the first cutting, a second may be made, and if the season is favorable a third cutting may be obtained. On July 4 we cut our patch the first time and secured 1.87 tons of hay per acre. With two more cuttings we expect to secure a total of at least 3.5 tons.

F. W. TAYLOR,  
Agriculturalist.

July, 1907.

#### PRESS CIRCULAR No. 2.

### SPRAYING FOR THE BROWN TAIL MOTH AND ORCHARD CATERPILLARS.

Inquiries frequently come to this office as to whether the young caterpillars of the brown-tail moth after they hatch from the eggs early in August may not be killed by spraying the foliage of the affected trees and thus prevent the formation of the winter webs. As the eggs are now on the trees and are just hatching, it seems opportune to call attention to the fact that the brown-tail moth may be very satisfactorily controlled in orchards by spraying at this time. Not only the brown-tail moth, but numerous other caterpillars commence to attack the foliage of the apple orchard early in August.

Among these may be mentioned the fall web-worm, a hairy caterpillar which spins its web over the foliage eaten; the yellow-necked apple caterpillar, a black larva with yellowish stripes and yellow collar or neck; and the red-humped apple

caterpillar, which is known by the prominent red hump bearing black spines, just back of the head. The yellow-necked and red-humped apple caterpillars are readily recognized by the fact that the eggs are laid on the tip of the twigs or limbs, and the caterpillars defoliate the twigs from the tip inward and usually feed in colonies. All of these caterpillars may be largely controlled by spraying during the first week of August with the arsenical poisons. Of these the arsenate of lead is the best insecticide, for the reason that it adheres best to the foliage and is not easily washed off by rain. It should be used at the rate of 5 lbs. to the barrel, and can be secured of any large seedsman or agricultural warehouse. It should be kept in stock by a local merchant in every town, as it is now coming into very general use for foliage insects. Paris green at the rate of 1-3 lb. to the barrel of water, to which should be added a pound or two of freshly-slaked stone lime, will also be effective, but it is more readily washed off by rain. Paris green should never be sprayed without adding the fresh-slaked stone lime to take up the free arsenic, as, otherwise, a burning of the foliage may occur from the soluble arsenic.

The spray should be applied very thoroughly to all parts of the trees, spraying from below and above, so as to reach both surfaces of the foliage. To reach most of the large orchard trees it is desirable to build a tower on the wagon, so that with an extension rod all parts of the tree can be sprayed, for it is well known that the brown-tail moth lays its eggs at the tips of the twigs, and the topmost branches must, therefore, be thoroughly drenched. Such a tower, and other spraying apparatus, is described in bulletin 131 of this Station, which may be had upon application.

Even with thorough spraying some of the caterpillars will escape, and there will be a few brown-tail nests, but with thorough work the number of caterpillars can be so reduced that there will be but few of the winter nests to prune. Spraying will be of little value after the latter part of August, as the young brown-tail caterpillars commence to spin up their winter webs by the latter part of the month or the first of September.

E. DWIGHT SANDERSON.

Aug. 2, 1907.

Entomologist.

## PRESS CIRCULAR No. 3.

## EARLY LAMB PRODUCTION.

The conditions afforded by New Hampshire offer an excellent opportunity for the production of early lambs for the Boston market. The demand for early, or, "hot-house" lambs, is increasing every year, and the prices paid for them should encourage our sheep raisers in this phase of the industry. The advantages of early lamb production are, first, that the lambs are prepared for market at the season when farm work is slack; second, that being necessarily housed during the period, there is no danger of their being killed by dogs, or affected by parasites; and third, that the maximum return is secured from the minimum of feed consumed. The price will depend upon the weight and quality of the lambs and the season at which they are marketted. Small lambs of a blocky shape, in extra good condition, bring more than large lambs only moderately fat. The best prices are usually obtained during the months of February and March, lambs dressing from 25 to 30 lbs., bringing from \$8 to \$12 per head. Through the months of April, May and June from \$4 to \$8 per head is obtained. Lambs are sold by the carcass until about July 1st, after which they are weighed and sold by the pound.

We have found that the early lambs shrink a little over 50 per cent. in dressing, so that they should weigh from 50 to 60 lbs. at the time of slaughter. The age required to attain this weight will depend upon the care and feeding and upon the breeding. Our best lambs have weighed 50 lbs. at the age of 10 weeks, while others have required 14 or 15 weeks.

For early lambs the breeding season should begin in August, at which time the ewes should be in good condition,—not fat but in medium flesh. The number of ewes allotted to a mature ram should not be over 50, and to a lamb ram not over 25. It is always well to give the ram a little grain such as oats and bran just before and during the breeding season. If the pasture is poor the ewes, also, should have a small allowance of grain. The proper food for pregnant ewes during the winter is clover hay and 2 or 3 lbs. of roots or a good quality of corn silage. About a month before lambing time, begin feeding grain at the rate of a handful per day, gradually increasing the amount to a pound or more per day. Weak lambs and ewes without milk at the time of parturition are frequently the result of not having the ewes prepared for the lambing season, and

the lack of succulent food and grain in their ration. The ewes should also have plenty of exercise during pregnancy.

It is also important that a ram of good breeding be used, preferably a pure-bred. The lambs are half the blood of their sire, and he should be a good one. Although grade ewes may be used successfully for early spring lambs, money put in a pure-bred ram will be well invested. After the breeding season the ram should not be allowed to run with the ewes.

The leading factors for a strong and vigorous crop of lambs are good care, proper food and plenty of exercise for the ewes, and a strong, thrifty, pure-bred animal used as a sire. If you are interested in the matter of early lambs, now is the time to think and act about it.

F. W. TAYLOR,  
Agriculturist.

Aug. 14, 1907.

#### PRESS CIRCULAR No. 4.

#### LOW GRADE COTTON SEED MEAL.

Among the samples of cotton seed meal collected during the past season by the New Hampshire State Board of Agriculture and sent to the Agricultural Experiment Station for analysis, there were two that need especial mention because they represent a class of goods which has not been observed before in this state.

The goods were properly tagged and bore plainly printed guarantees of protein and fat as the law requires. The samples were marked, respectively, Glenwood Brand Cotton Seed Feed, Protein 22 per cent., Fat 5 per cent.; and Sea Island Cotton Seed Meal, Protein 25 per cent., Fat 6 per cent. The chemical analysis showed them to be practically equal to their claims in each constituent. Therefore, no fault could be found with them on that score.

The price of these goods, was, however, of decided interest, when compared with that of standard cotton seed meal. Eight samples of standard meal contained from 38 per cent. to 42 per cent. protein and from 8.7 per cent. to 10.5 per cent. of fat. The retail prices were \$1.60 and \$1.65 per 100 pounds. The Glenwood and Sea Island brands retailed for \$1.50 per 100 pounds.

Crude fiber was determined in the Glenwood sample, and was found to be 21 per cent. Standard cotton seed meal varies between 5 and 7 per cent. for fibre. It is plain that the two brands in question, besides possessing but three-fifths as much protein and fat, contain about three times as much indigestible

matter as standard meal, while they are retailed at nine-tenths the price of the best. Or, to put it in another way, when standard meal containing 39 per cent. protein and 9 per cent. fat sold for \$1.60 per 100 pounds, one pound of those nutrients cost three and one-third cents, while in the Glenwood brand, containing 22 per cent. protein and 5 per cent. fat, at \$1.50 per 100 pounds, a pound of those nutrients cost five and one half cents. These low grade materials cost too much to be economical.

Another sample of cotton seed meal among those collected in the inspection, requires notice because it was a positive fraud. It bore the tag and guarantee of a standard article and was retailed at the usual price of \$1.60 per 100 pounds. The meal was even poorer than the Glenwood and Sea Island. The analysis revealed 19 per cent. protein, 5.5 per cent. fat and 22 per cent. fibre. Since cotton seed hulls contain over 40 per cent. fiber, this meal must have had about two-fifths of its weight made up of hulls, instead of being a pure meal. They were finely ground and not very noticeable, but imparted a brown color to the meal, and when a portion of it was placed on the surface of a glass of water, there was an immediate separation of the heavier hulls by settling. The name of the brand is withheld, since the tag may have been changed from a standard article to the inferior goods, without the manufacturer's or jobber's knowledge.

These goods are the first instances for several years of such marked departures from the old standards of cotton seed meal. Since standard meal will probably be even higher this fall and coming winter than last year, there will be an effort to push the lower grades because of the lower price. Buyers of grain should scrutinize both tags and quality keenly before completing a purchase, as it is natural to charge all that the market will bear for an inferior article even if there is no fraudulent substitution of tags or dishonest claims.

FRED W. MORSE,  
Chemist.

Sept. 13, 1907.



## PRESS CIRCULAR No. 5.

TO NEW HAMPSHIRE DAIRYMEN.  
HERD TESTING ADVOCATED BY STATE EXPERIMENT  
STATION.

Average production of a dairy herd for a period of eleven years.

Year	Pounds of Milk.	Percent of Fat.	Pounds of Fat
1895	5073	3.19	161.8
1896	5994	3.18	190.6
1897	6401	3.08	197.2
1898	6504	3.25	211.4
1899	7329	3.36	246.3
1900	6124	3.48	213.1
1901	6850	3.32	227.4
1904	7950	3.39	269.5
1905	8447	3.38	285.5

It will be noticed that the increased average production in the year 1905 over the year 1899 was 67 per cent., or, 3410 lbs. of milk and 76.5 per cent., or 123.7 lbs fat. The increase in the per cent. of fat was 6 per cent., or .19. This is not an accident, but is brought about by careful selection, breeding and feeding. It is the result of making a careful study of the details of the business. Records were kept of the individual cows in the herd. The Babcock test was used to determine the per cent. of fat in each cow's milk. The poorer cows were eliminated, and the calves of only the better ones were used in building up the herd. A study of the above table speaks louder than words as to the results accomplished.

According to the last census there are in New Hampshire 129,900 cows. An increase of one pound of butter fat per cow, worth 30 cents, would add \$38,970 to the value of the dairy products in this state, not counting the value of the skim milk, which, at 25 cents a 100 lbs. would be \$8,020. An increase of 25 lbs. of milk per cow, if the milk was sold at 30 cents a can, would add \$52,662 to the present value of our dairy products. When, noticing in the table above that the year 1896 shows an increase of 921 lbs. of milk and 28.6 lbs. fat per cow over the previous year, one can hardly realize the possibilities of this work, both to the individuals and the state. It is better to increase the profits in dairying by cheapening the production of milk through a system of records of the individual cows, than to depend upon higher prices. Prices will always fluctuate, while an improvement in the herd is more apt to continue to increase, rather than to fluctuate.

There is no way in which the farmers of New Hampshire can further their interest so greatly as by systematic improvement of the dairy herd. People, as a rule, are in the dairy business



for the sake of making money. If that is true why not weigh and test the milk of the individual cows in the herd, which is the only sure way to determine their value.

At present there is an increased interest in the keeping of records and testing of cows, both in New Hampshire and other states. In order to help in the advancement of this work the New Hampshire Experiment Station offers to test, free of charge, a limited number of dairy herds. This is an opportunity which ought to be welcomed by every farmer who keeps cows. Full particulars regarding this work can be had by mailing a card to the New Hampshire Experiment Station, Dairy Dept., Durham, N. H., stating the number of cows in your herd. Do it now.

FRED RASMUSSEN,  
Dairyman.

#### PRESS CIRCULAR No. 6.

#### POULTRY MANURE.

From time to time questions regarding poultry manure are received, and they include such topics as its preservation, value, use and so forth. Just now, at the beginning of the winter season, the preservation is of first importance.

As is well known, when the poultry droppings accumulate under the roosts and when they are left in barrels, there is a strong odor of ammonia noticeable. The development of such an odor is a sure sign that gaseous ammonia is escaping into the air to be lost for the present. How to prevent such a loss is to prevent the development of the odor. Several chemicals of more or less fertilizing value in themselves, may be added to the droppings from time to time with good effect, both in stopping waste and in making the atmosphere of the hen-house more wholesome.

The best materials for this purpose are gypsum or land plaster, acid phosphate, and kainit, a cheap potash salt. Each of these chemicals has the power of forming new compounds with the ammonia as fast as it is set free from the original combination. Wood ashes and slaked lime should never be used because they cannot combine with ammonia while they do force it out of its compounds and take its place. Plaster is apt to produce a dry, lumpy mixture when used in large enough quantities to arrest the ammonia, while kainit and acid phosphate produce the opposite effect of a moist, sticky mass.

In Bulletin 98 of the Maine Experiment Station, is described an experiment in which sawdust was used in addition to the chemicals. By this addition of an absorbent, the kainit and acid phosphate could then be used with excellent results.

Using their results as a basis for calculation, the weekly droppings of a flock of twenty-five hens, when scraped from the roosting platforms, should be mixed with about eight pounds of kainit or acid phosphate and a half peck of sawdust. If one desires a balanced fertilizer for corn and other hoed crops, a mixture of equal parts of kainit and acid phosphate could be used instead of either alone.

Good dry meadow muck, or peat, would be equally as good as sawdust; if not better, to use as an absorbent.

In the experiment mentioned, more than half of the ammonia was lost in hen manure without chemicals, when compared with that which had been mixed with them.

Fresh poultry manure at the present values of fertilizers would be worth sixty cents per hundred pounds. Figures from different experiment stations would give the product of twenty-five hens for the winter season of six months, as three hundred and seventy-five pounds from the roost droppings only.

Poultry manure is especially adapted as a top dressing for grass because of its high content of nitrogen in the form of ammonia compounds, which are nearly as quick in their effect as nitrate of soda. A ton of the manure preserved with sawdust and chemicals, would be sufficient for an acre, when compared with a chemical formula for top dressing.

On the same basis of comparison, one hundred fowls running at large on an acre, should in a summer season of six months have added to its fertility the equivalent of at least two hundred pounds of sulphate ammonia, one hundred pounds of high grade acid phosphate and sixty pounds of kainit.

FRED W. MORSE.

Dec. 6, 1907.

Chemist.

PRESS CIRCULAR No. 7.

GOOD GRASS SEED.

All farmers are troubled more or less with weeds, and much extra labor is required every year on the farm on account of them. When a meadow or pasture becomes too weedy it is plowed up and planted for several seasons with some cultivated crop in order to get the weeds killed out before again seeding down. In many cases, contrary to expectations, the newly

seeded field is as weedy, or, weedier, than it was before, and we wonder how it all happened. The fact of the matter is that we have sown the weeds with our grass seed and did not know it. Again, we often get a poor stand of grass and for want of a better reason ascribe it to dry weather or bad luck, while the real trouble has been that the seeds have had little or no vitality. It frequently happens that dealers will have a supply of old seed left over from the previous year, and in order to dispose of it will mix it with the new seed. Since the vitality of seeds rapidly decreases with their age, the result is a mixture with a low germination test, and when the process is repeated for several years an exceedingly bad lot of seed is obtained.

It is a notorious fact that much of the grass seed offered for sale is of poor quality, both as regards its purity and germination. Some preliminary tests made here at the college last spring showed certain commercial samples of seed corn to have a vitality of less than 75 per cent.; vetch, 34 per cent.; rape, 54 per cent.; timothy, 20 per cent.; and red top, 6 per cent. In the various samples of grass seed inspected were found all sorts of impurities, including dirt, sand, hulls, chaff, weed seeds and other grass seeds some of which were not harmless but yet constituting an impurity. Among the most noxious and injurious weed seeds found were the following: Bitter dock, Canada thistle, crab grass, goosefoot, green foxtail, lady's thumb, rib grass, plantain, sheep sorrel, yellow daisy and yellow foxtail.

While the purity test is not so easy for the average farmer to make, a sufficiently accurate germination test can be made by most anyone. The simplest way of doing this is to count out 200 seeds and place them between sheets of blotting paper, which are kept moist and in a warm room for five or six days. To determine whether the seed contains any considerable amount of impurities it may be spread on a sheet of paper or a white plate, and with a little practice one will soon be able to detect the more common kinds of weed seeds and to estimate the amount of them in a given sample under test.

Some states have laws regulating the inspection and sale of seeds so that the farmer is protected from fraud, either intentionally or otherwise perpetrated. In the absence of such a law in this state the Experiment Station is planning to make a limited number of purity and germination tests of grass and forage crop seeds for farmers and dealers desiring them, free of charge. Farmers buying seeds should either insist on a guarantee of

purity and vitality or else buy only on the basis of a sample submitted and tested by a competent person.

All farmers and seed dealers, who wish to take advantage of this opportunity to have seeds tested, will make request to the Experiment Station for printed directions in regard to taking the samples and the amounts of seed necessary for a test.

F. W. TAYLOR,

Jan. 3, 1908.

Agriculturist.

#### PRESS CIRCULAR No. 8.

#### SOME POINTS ABOUT FERTILIZERS.

This article aims to answer in a brief way the question commonly asked about fertilizers:

The most economical goods are the high grade chemicals and mixed fertilizers. It costs no more to handle a hundred pounds of a high grade material than the same weight of low grade, and the freight is no more on it. Ten dollars will go further in the purchase of the high grade goods because the nitrogen, phosphoric acid and potash cost less per pound. For example, a high grade potato fertilizer containing 3.3 per cent. nitrogen 8 per cent available phosphoric acid and 7 per cent potash, sells this year for \$39 per ton, and another potato fertilizer containing 2.1 per cent nitrogen, 8 per cent phosphoric acid and 4 per cent potash sells for \$32 per ton. The higher-priced one contains \$5.00 more value in nitrogen and \$4.00 more value in potash or a total of \$9.00 greater value.

The most common method among farmers in the use of fertilizers is to apply a few hundred pounds of the commercial stuff in the drill and to spread the manure broadcast, the object being to give the plants a quick start. With this in view, nitrogen is especially important, and 200 lbs. of the high grade fertilizer is more effective than 300 lbs. of the lower grade, both in amount of nitrogen and in availability.

Sometimes one asks about the relative merits of animal fertilizers compared with mineral fertilizers. A few words may make their differences plain. All potash comes from minerals unless some vegetable matter like cotton seed is used. Phosphoric acid soluble in water or, in the reverted form, is the same, whether obtained by treating bones, bone-black or rock phosphate with sulfuric acid. It was phosphate of lime in each original substance and becomes superphosphate of lime in each case, after acid treatment. Nitrogen in nitrate of soda and sulfate of ammonia is in mineral form, and will act on

crops more quickly than nitrogen in animal matter, because the animal matter must first be destroyed and its nitrogen changed to nitrate. A good mixed fertilizer should contain both kinds of nitrogen; mineral nitrogen for the quick start in the spring, and the animal nitrogen for later effect and for keeping the different minerals from caking together after mixing is done.

There is no loss worth noting during the growing season from leaching or mineral nitrogen, since there is seldom enough rainfall to make up for the drying out of the soil at the surface. Besides the one form of nitrogen is no more likely to evaporate than the other.

It is not advisable to put on large quantities of soluble fertilizers from the standpoint of economy because the surplus phosphoric acid and potash must become slowly less soluble while the excess of nitrogen will leach away.

Chemicals or home-mixed fertilizers are to be preferred to ready-mixed fertilizers, since money goes farther in buying the former, when the amounts of actual plant food are compared. The cash saving is not large on small quantities, but it is worth while, even then to mix one's goods, because the quality of the materials is more certain to be of the best, especially in comparison with low grade mixed fertilizers.

Space does not permit several formulas, but the Agricultural Experiment Station will always respond to requests for such information, and directions for home mixing will be given in the next press bulletin.

FRED W. MORSE,

Feb. 6, 1908.

Chemist.

PRESS CIRCULAR No. 9.

TO NEW HAMPSHIRE DAIRYMEN.  
BUYING AND SELLING A COW ON ONE TEST.

One test of a cow only shows what she did at one milking, which is no indication of the ability or value of a cow.

Different conditions will cause a variation in per cent. of fat in cow's milk. In the early part of the lactation period when the cow is giving a large quantity of milk, the test is lower than in the latter part of the lactation period, when the milk flow is decreasing. The variation may range from a half up to three per cent depending upon the breed and individuality of the cow.

The per cent. of fat may also be influenced by the time between milking. In an experiment where cows were milked at



six o'clock in the morning and three in the afternoon, the average test in the afternoon was 4.6 per cent while in the morning it was 2.8 per cent. When the same cows were milked at 5.30 A. M. and 5 P. M., the fat content of the evening milk was 3.8 per cent and of the morning milk 3.18 per cent. The first milk drawn from the cow is much thinner than the last. Investigations by de Vriezes show the following results: in the first streams 1.2 per cent fat; after drawing about one-fourth the quantity of milk, 2.1 per cent fat; after drawing about three-fourths of the milk 5.2 per cent fat; in the last milk 7.1 per cent and in the very last drop of milk drawn, 10 per cent fat.

The relation between the nervous system of the cow and her powers of milk secretion is so intimate that any changes and abnormal conditions the cow experiences will have a direct influence upon the quantity and quality of the milk. Changes of food, of the time of feeding and drinking, restlessness in stable, changes in weather, etc., will tend to vary the quality and quantity of milk secreted. A cow tested by the writer under normal conditions gave milk testing about 4 per cent. Once while in heat she tested 12 per cent.

Furthermore, the value and reliability of a single test is also dependent upon the honesty and skill of the man who samples the milk. It is very essential to have the milk thoroughly mixed before the sample is taken. More conditions for, and examples of variation in cow's milk can be given, but this will illustrate the uncertainty of using the test of a single milking as a guide in the buying or in the selling of cows. To find the value of a cow it is necessary to weigh and test her milk at regular intervals during the lactation period.

A local test association will solve this problem. The Dairy Department, New Hampshire Experiment Station, will assist in organizing. Blanks for keeping daily records, and directions for weighing and sampling can be had upon application.

FRED RASMUSSEN,

Mar. 27, 1908.

Dairyman.

#### PRESS CIRCULAR No. 10.

#### COTTON SEED MEAL AND MIXED FEED.

The Chemical Department of the New Hampshire Agricultural Experiment Station has recently completed the analyses of all brands of cotton seed meal and mixed feed licensed and sold in



the state. There were in all eight samples of cotton seed meal and eighteen of mixed feed.

Both classes of material were equal to or better than their guaranties in both protein and fat. There were no low grade mixtures of cotton seed meal and hulls found, and only one sample that was off color; but all samples were of high grade meal, and with a single exception, they were bright yellow in color and with a fresh, sweet odor.

The mixed feeds were all pure wheat products and included none of the mixtures of corn-cob meal obtained in previous years.

This absence of low grade goods in both classes is gratifying evidence of the effects of inspection and publicity, and of the desire of dealers to handle only the best materials.

The cotton seed meals bore guaranties of protein ranging from 38 to 41 per cent and they were found to contain from 40.06 per cent to 44.93 per cent. The mixed feeds were not guaranteed in a majority of cases, since there is confusion over the law, as some states exempt them when prepared from pure wheat products.

They should bear guaranties in this state, and on eight brands the claims for protein ranged from 14 to 17 per cent. The analyses of all gave a range from 15.09 per cent to 17.72 per cent.

The fat in cottonseed meals varied from 8.38 per cent to 10.77 per cent while in the mixed feeds the range was from 4.06 to 5.39.

The samples were collected early in March and prices at the time varied from \$1.60 to \$1.70 per 100 pounds for cottonseed meal and from \$1.45 to \$1.70 for mixed feed. The prevailing prices were \$1.60 and \$1.65 for either of the materials.

This equality in prices is of great interest in connection with economical feeding of live stock. It should be well known that the reason for exacting a printed statement of the percentages of protein and fat in commercial feeding stuffs, is that these ingredients are the most valuable portions of the grain. Yet in the face of the wide difference in printed guarantees purchasers are regularly paying as much for one as for the other.

The milch cow needs protein in her food to meet the daily drain in the milk. In cottonseed meal one buys 31 pounds of digestible protein in every hundred pound sack, while one gets but 12½ pounds in a sack of mixed feed. Furthermore, a sack of cottonseed meal is worth \$1.17 for the fertilizing elements in it; and the sack of mixed feed contains but 58 cents worth of such

elements. Therefore the farmer who feeds mixed feed is paying more than twice as much for his protein and fertility as the one who uses cottonseed meal.

FRED W. MORSE,

May 29, 1908.

Chemist.

PRESS CIRCULAR No. 11.

AN OUTBREAK OF FOREST CATERPILLARS.

For the past month serious injury to hardwood trees by caterpillars has been reported throughout the hill towns of the state south of the White Mountains. In Ossipee, Tamworth, and Sandwich several thousand acres have been denuded so the forests composed largely of maple and beech are as bare as in winter. Serious injury also occurs in Plymouth, Sanbornville, Laconia, Weare, Hancock, Sullivan, Newport and elsewhere. No injury has been observed or reported north of Intervale, nor does any injury occur in the valleys or on isolated shade trees.

This unprecedented injury is due to a green caterpillar, about one and one-half inches long when full grown, of a bright green color and marked on the back with purplish-red of variable pattern but usually consisting of an arrow-head mark about the middle of the back and minor markings toward the head and tail. The caterpillar is the larva of a native moth, *Heterocampa guttivitta* Walk. As it has never attracted attention before it has received no common name, but may well be termed the Purple-marked Forest Caterpillar. The insect has always occurred here and throughout the eastern United States, but has never done any injury. The present outbreak is, therefore, most unprecedented.

Almost all insects are prevented from increasing in abnormal numbers by their natural enemies, either parasitic insects, predaceous insects, or diseases. In the present case some of these natural enemies have been destroyed, probably by weather conditions, and the insect has, therefore, increased in abnormal numbers. Just what the most important of its natural enemies are, remains to be determined and they are being studied. It is evident that it is entirely impossible to cope with the pest upon hundreds of acres of forest land in an artificial manner. Shade trees near infected forests may be protected by spraying with arsenate of lead, three to five pounds per barrel of water, or by tying strips of sticky fly-paper or tanglefoot around the trunks and thus preventing the ascent of the caterpillars. The injury by the pest seems to be about over for this year. When full grown the caterpillar descends to the base of the tree and

there changes into a chrysalis or pupa about two inches under the surface of the leaf mold. Whether another brood of moths will emerge or not is not known, but it seems most probable that there is but one brood and that the moths will emerge next May and June. The moth is of an olive color with a wing expanse of about one and one-half inches.

The writer will be indebted to any who send him considerable numbers of the caterpillars and also for information concerning the extent and seriousness of the damage in their vicinity.

It seems doubtful whether so serious damage will occur another year, but only a better knowledge of the pest's enemies will enable to make intelligent predictions.

E. DWIGHT SANDERSON,

August, 1908.

Entomologist.

PRESS CIRCULAR No. 12.

KEEP THE APPLES IN A COOL PLACE.

Apple picking time will soon be here and both growers and buyers who are planning to store their fruit for advanced prices in the spring, should bear in mind the information given in Bulletin 135 of the New Hampshire Agricultural Experiment Station.

It has long been known that fruit ripens faster in a warm place than in a cool one, and this knowledge is applied in handling pears, bananas and other fruits that are picked green for long shipments.

Winter apples also undergo this ripening process, commonly called "after-ripening." The process has been shown to be accomplished by chemical changes in the constituents of the fruit-cells.

In addition to preventing decay, an important effect of cold-storage is retarding the chemical changes of after-ripening.

In the bulletin attention is called to the fact that during all this period of after-ripening, the apple is carrying on a breathing process, which is shown by the exhalation of carbonic acid gas, and which marks the progress of chemical action. The respiration must result in the destruction of the apple's own cell-contents, since there is no outside food-supply to provide material for the formation of carbonic acid in animals.

Experiments show that there is a definite rate of variation of the chemical activity as the temperature of the fruit changes. If the temperature of the fruit is raised eighteen degrees, the amount of carbonic acid given out is more than double what it is at the lower temperature.

In October, the average maximum temperature in this locality is 60 degrees, and the average minimum temperature is a little under 40 degrees. Apples in a cool cellar which can be kept at the lower temperature will then change only half as fast as those exposed to the higher one. The average daily temperature in October and early November is about 48 degrees, hence it can be seen that one month out of storage in the fall will carry the ripening process along to a stage which it would barely reach in two months of cold-storage.

It is doubtful economy to hold fine apples outside of cold storage warehouse to save a month's charges, since it should be clearly seen that these experiments show that the earlier they are put in a cool place the firmer their flesh and the better their flavor in the spring months to come.

The process of after-ripening is a complex chemical problem, but like most chemical reactions, it follows changes in temperature in accordance with well-known laws and can be retarded to the minimum at 32 degrees and quadrupled by raising the temperature to 70 degrees.

FRED W. MORSE,  
Chemist.

Sept. 25, 1908.



# METEOROLOGICAL RECORD

JULY 1, 1906, TO JUNE 30, 1908.

DURHAM, N. H., Latitude  $43^{\circ} 8'$ , N , Longitude  $70^{\circ} 56'$ , W.  
Elevation above the sea 88 feet.



## Meteorological Record: Month of July, 1906.

July, 1906.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	74	59	15	Show ers		.44		N.	Partly cloudy..
2	78	52	16	Show ers		.38		E.	Partly cloudy..
3	79	62	17					E.	Partly cloudy..
4	85	65	20	Show ers		.60		N.	Partly cloudy..
5	72	51	21					N. N. E.	Partly cloudy..
6	74	45	29					E.	Partly cloudy..
7	75	43	32					E.	Partly cloudy..
8	76	53	23					E.	Partly cloudy..
9	78	53	25	8.22 a. m.	11.30 p. m.	.04		S. E.	Cloudy.....
10	85	59	26	Show ers		.04		S. E.	Partly cloudy..
11	80	59	21	Night	Night	.02		S. E.	Partly cloudy..
12	77	57	20					S. E.	Partly cloudy..
13	85	52	33					S. E.	Clear.....
14	81	53	28					S. E.	Partly cloudy..
15	86	52	33					S. E.	Partly cloudy..
16	82	53	29					S. S. E.	Partly cloudy..
17	90	60	30	4.54 p. m.	7.40 p. m.	.97		S. W.	Partly cloudy..
18	84	61	23					W.	Partly cloudy..
19	86	52	34					S. W.	Clear.....
20	85	55	30					S.	Partly cloudy..
21	83	66	17	Show ers		.03		S. W.	Cloudy.....
22	90	60	30	Night	Night	.10		S. W.	Partly cloudy..
23	83	69	14					S. W.	Cloudy.....
24	77	67	10					W.	Cloudy.....
25	76	59	17					E.	Partly cloudy..
26	72	49	23					N. E.	Partly cloudy..
27	77	58	19	8.47 p. m.	Night	.03		S. E.	Partly cloudy..
28	77	56	21					S. E.	Partly cloudy..
29	85	65	20					S.	Partly cloudy..
30	84	64	20	Show ers		.91		S. W.	Partly cloudy..
31	82	64	18					E.	Partly cloudy..
Sum	2500	1774	714			3.56			
Mean	80.64	57.22	23.03						

† Including rain, hail, sleet and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 80.64; Mean minimum, 57.22; Mean, 68.93; Maximum, 90; Date, 17, 22; Minimum, 43; Date, 7; Greatest daily range, 34.

PRECIPITATION—Total, 3.56 inches; Greatest in 24 hours, .97; Date, 17.

NUMBER OF DAYS—With .01 inch or more precipitation, 11; Clear, 2; Partly cloudy, 25; Cloudy, 4.

DATES OF—Thunderstorms, 17, 21, 29, 31.

## Meteorological Record: Month of August, 1906

August, 1906.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	†Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	75	63	12	8.57 p. m.	Night	.55		E.	Cloudy .....
2	76	56	20					E.	Partly cloudy..
3	73	54	19					S. E.	Cloudy .....
4	69	62	7	Showers		.20		S. E.	Cloudy .....
5	90	65	25					S. E.	Clear .....
6	94	64	30	3.20 p. m.	3.20 p. m.	.18		S. W.	Partly cloudy..
7	85	68	17					N. W.	Partly cloudy..
8	77	64	13	a. m. Showers		.03		S. E.	Partly cloudy..
9	85	57	28					S. E.	Partly cloudy..
10	77	52	25	Drizzle 4.15	4.30 p. m.			S. E.	Partly cloudy..
11	85	63	22	Showers		.12		S. E.	Partly cloudy..
12	83	61	22					N. W.	Partly cloudy..
13	75	45	30					W.	Partly cloudy..
14	75	52	23					N. W.	Partly cloudy..
15	74	45	29					W.	Partly cloudy..
16	79	46	33					W.	Partly cloudy..
17	84	50	34					W.	Clear .....
18	94	56	38					S. W. W.	Clear .....
19	96	76	20					S. S. W.	Clear .....
20	91	69	22					S. W.	Cloudy .....
21	85	69	16	12 m.	12.30 p. m.	.46		S. S. W.	Cloudy .....
22	89	68	21					S. S. W.	Cloudy .....
23	91	68	23	7.05 p. m.	8 p. m.	.58		S. W.	Partly cloudy..
24	74	58	16	Night		.4		N. E.	Partly cloudy..
25	73	46	27					E.	Partly cloudy..
26	77	57	20					S. E.	Cloudy .....
27	85	62	23	7 p. m.	8 p. m.	.2		S. E.	Cloudy .....
28	80	62	18					S.	Cloudy .....
29	77	42	35					S.	Partly cloudy..
30	87	55	32					S. S. W.	Partly cloudy..
31	79	67	12	Night		.15		S. S. W.	Partly cloudy..
Sum	2534	1822	712			2.87			
Mean	81.74	58.77	22.97						

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 81.74; Mean minimum, 58.77; Mean, 70.25; Maximum, 96; Date, 19; Minimum, 42; Date, 29; Greatest daily range, 38.

PRECIPITATION—Total, 2.87 inches; Greatest in 24 hours, .58; Date, 23.

NUMBER OF DAYS—With .01 inch or more precipitation, 10; Clear, 4; Partly cloudy, 18; Cloudy, 9.

## Meteorological Record: Month of September, 1906.

September, 1906.	TEMPERATURE.			PRECIPITATION.					Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.		
1	69	54	15						W.	Partly cloudy..
2	75	40	35						S. S. W.	Partly cloudy..
3	80	62	18	Showers		.35			N. W.	Partly cloudy..
4	65	49	16						S. E.	Partly cloudy..
5	74	37	37						S. S. E.	Partly cloudy..
6	89	40	49						S. W.	Partly cloudy..
7	85	52	33						S. W.	Partly cloudy..
8	73	53	20						S. E.	Partly cloudy..
9	88	46	42						S. S. E.	Partly cloudy..
10	76	51	25						S. E.	Clear.....
11	79	45	34						S. S. E.	Partly cloudy..
12	84	52	32						S. S. W.	Partly cloudy..
13	83	62	21						S. S. W.	Cloudy.....
14	75	58	17						N. N. W.	Partly cloudy..
15	65	45	20						N. E.	Clear.....
16	64	39	25						S. E.	Clear.....
17	79	36	43						S. W.	Clear.....
18	90	57	33	Night	6.55 a. m.	.01			N.	Partly cloudy..
19	88	59	29						E. S. E.	Clear.....
20	73	58	15						E. S. E.	Partly cloudy..
21	85	59	26						E. S. E.	Partly cloudy..
22	70	57	13	12 m.	6 p. m.	.26			S. E.	Cloudy.....
23	78	57	21	Night	Night	.16			N. W.	Partly cloudy..
24	64	41	23						N. N. W.	Partly cloudy..
25	68	29	39						S.	Clear.....
26	72	39	33						S. W.	Clear.....
27	68	53	15	Night	2.30	.34			N. N. W.	Cloudy.....
28	71	44	27						E. S. E.	Partly cloudy..
29	68	36	32						S. S. W.	Partly cloudy..
30	55	46	9	Night	Night	.02			N. W.	Partly cloudy..
31										
Sum	2255	1456	799			1.14				
Mean	75.16	48.53	26.63							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 75.16; Mean minimum, 48.53; Mean, 61.85; Maximum, 90; Date, 18; Minimum, 29; Date, 25; Greatest daily range, 49.

PRECIPITATION—Total, 1.14 inches; Greatest in 24 hours, .35; Date, 3.

NUMBER OF DAYS—With .01 inch or more precipitation, 6; Clear, 7; Partly cloudy, 20; Cloudy, 3.

DATES OF Killing frost, 25.

## Meteorological Record: Month of October, 1906.

October, 1906.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	64	29	35	.....	.....	.....	.....	.....	Partly cloudy..
2	69	34	35	.....	.....	.....	.....	.....	Partly cloudy..
3	66	33	33	.....	.....	.....	.....	.....	Partly cloudy..
4	67	43	24	.....	.....	.....	.....	.....	Partly cloudy..
5	70	42	28	.....	.....	.....	.....	.....	Partly cloudy..
6	71	46	25	Night also 4.30 p. m.	.....	.31	.....	.....	Cloudy .....
7	65	44	21	.....	Night	.02	.....	.....	Partly cloudy..
8	61	33	28	.....	.....	.....	.....	.....	Clear.....
9	71	38	33	5.30 p. m.	.....	.01	.....	.....	Partly cloudy..
10	62	44	18	.....	Night†	.91	.....	.....	Partly cloudy..
11	53	30	23	.....	.....	.....	.....	.....	Partly cloudy..
12	51	31	20	.....	.....	.....	.....	.....	Clear.....
13	54	24	30	.....	.....	.....	.....	.....	Clear.....
14	61	24	37	.....	.....	.....	.....	.....	Partly cloudy..
15	67	30	37	.....	.....	.....	.....	.....	Partly cloudy..
16	60	36	24	.....	.....	.....	.....	.....	Partly cloudy..
17	54	42	12	.....	.....	.....	.....	.....	Partly cloudy..
18	54	43	11	.....	.....	.....	.....	.....	Partly cloudy..
19	62	47	15	7.20 p. m.	7.40 p. m.	.01	.....	.....	Partly cloudy..
20	63	55	8	9.30 a. m.	2.40 p. m.	.28	.....	.....	Cloudy .....
21	58	49	9	Night	Night	.01	.....	.....	Partly cloudy..
22	53	44	9	Night	Night	trace	.....	.....	Partly cloudy..
23	67	47	20	.....	.....	.....	.....	.....	Partly cloudy..
24	55	38	17	.....	.....	.....	.....	.....	Partly cloudy..
25	64	42	22	7.15 a. m.	10.30 a. m.	.60	.....	.....	Cloudy .....
26	61	34	27	.....	.....	.....	.....	.....	Partly cloudy..
27	56	32	24	.....	.....	.....	.....	.....	Cloudy .....
28	60	44	16	.....	.....	.....	.....	.....	Partly cloudy..
29	49	34	15	.....	.....	.....	.....	.....	Partly cloudy..
30	43	31	12	.....	.....	.....	.....	.....	Cloudy .....
31	42	33	9	Night	1.30 p. m.	.18	.....	.....	Partly cloudy..
Sum	1853	1276	577	.....	.....	2.33	.....	.....	.....
Mean	59.7	41.1	18.6	.....	.....	.....	.....	.....	.....

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 59.7; Mean minimum, 41.1; Mean, 50.4; Maximum, 71; Date, 6 and 9; Minimum, 24; Date, 13 and 14; Greatest daily range, 37.

PRECIPITATION—Total, 2.33 inches; Greatest in 24 hours, .91; Date, 10.

NUMBER OF DAYS—With .01 inch or more precipitation, 8; Clear, 3; Partly cloudy, 23; Cloudy, 5.

DATES OF Thunderstorms, 9.

## Meteorological Record: Month of November, 1906.

November, 1906.	TEMPERATURE.			PRECIPITATION.					Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.		
1	42	31	11						N. W.	Cloudy
2	42	32	10	Night	Noon	.26	.5		N.	Cloudy
3	61	31	30						N. W.	Partly cloudy
4	52	32	20						N. N. W.	Partly cloudy
5	56	24	32						N. E.	Partly cloudy
6	51	31	20						N. N. W.	Partly cloudy
7	45	32	13						N. W.	Clear
8	51	30	21						N.	Clear
9	45	31	14						N. W.	Partly cloudy
10	50	33	17						N. W.	Partly cloudy
11	39	29	10	11.30 a. m.		1.11	.5	.5	E.	Cloudy
12	35	32	3	—	4 p. m.	.20			N.	Cloudy
13	40	26	14						W.	Partly cloudy
14	48	25	23						W. N. W.	Partly cloudy
15	56	23	33	3.30 p. m.		.62	2.1	2.1	N. E.	Cloudy
16	36	34	2		Night	.02	2.1	2.0	N. W.	Partly cloudy
17	45	39	6						W. N. W.	Partly cloudy
18	60	34	26						W. S. W.	Cloudy
19	60	35	25						W. N. W.	Partly cloudy
20	48	41	7						W. N. W.	Cloudy
21	45	37	8	Night also 2.45 p. m.	—	.40			N. W.	Cloudy
22	48	36	12		Night	.11			W.	Partly cloudy
23	45	32	13						W. N. W.	Clear
24	38	30	8						N. W.	Partly cloudy
25	49	23	26						W. N. W.	Clear
26	46	36	10	Night		.02			W.	Cloudy
27	45	30	15		3.30 p. m.	.22	.5	.25	E. N. E.	Cloudy
28	35	26	9	Flurries	all day	.12	1.6	1.9	E. N. E.	Cloudy
29	31	20	11	Night	Night	.03		1.7	N. W.	Partly cloudy
30	34	18	16					1.7	W.	Partly cloudy
31										
Sum	1238	912	326			3.11	5.2			
Mean	41.26	30.4	10.86							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 41.26; Mean minimum, 30.4; Mean, 35.83; Maximum, 61; Date, 3; Minimum, 18; Date, 30; Greatest daily range, 32, on 5th.

PRECIPITATION—Total, 3.11 inches; Greatest in 24 hours, 1.11; Date, 11.

SNOW—Total fall, 5.2 inches; on ground, 15th, 2.1 inches; at end of month, 1.7 inches.

NUMBER OF DAYS—With .01 inch or more precipitation, 11; Clear, 4; Partly cloudy, 15; Cloudy, 11.

## Meteorological Record: Month of December, 1906.

December, 1906.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	†Amount.	Snowfall in inches.		
1	41	24	17	.....	.....	.....	.....	N. W.	Partly cloudy.
2	33	6	27	.....	.....	.....	.....	N. W.	Clear.....
3	26	5	21	Night	9.30 a. m.	.10	1.5	N. W.	Partly cloudy..
4	19	4	15	.....	.....	.....	.....	W.	Clear.....
5	30	1	29	.....	.....	.....	.....	W.	Partly cloudy..
6	37	19	18	Night	8.00 p. m.	.71	2.5	N.	Cloudy.....
7	37	-3	40	.....	.....	.....	.....	N. W.	Partly cloudy..
8	5	-6	11	.....	.....	.....	.....	W. N. W.	Partly cloudy..
9	10	3	7	Night	Night	.01	.....	N. W.	Cloudy.....
10	27	13	14	Night	8.00 p. m.	.45	5.0	N. W.	Cloudy.....
11	31	13	18	.....	.....	.....	.....	N.	Clear.....
12	25	6	19	.....	.....	.....	.....	N.	Clear.....
13	36	8	28	.....	.....	.....	.....	N.	Cloudy.....
14	35	17	18	.....	.....	.....	.....	N.	Cloudy.....
15	36	17	35	Night	Evening	.42	1.0	N.	Cloudy.....
16	40	28	12	.....	.....	.....	.....	N. W.	Clear.....
17	36	20	16	.....	.....	.....	.....	N. W.	Cloudy.....
18	31	9	22	.....	.....	.....	.....	N. N. W.	Partly cloudy..
19	26	-11	37	.....	.....	.....	.....	N. N. W.	Clear.....
20	29	-7	36	9.30 a. m.	.....	.06	.....	N.	Cloudy.....
21	39	28	11	.....	.....	.....	.....	N. E.	Cloudy.....
22	42	30	12	.....	.....	.....	.....	N. N. E.	Cloudy.....
23	44	12	32	Night	2.00 p. m.	.64	12.	N. W.	Cloudy.....
24	21	10	11	8.30	10.25	.24	2.	N. E.	Cloudy.....
25	26	12	14	8.35	9.40	.12	1.	N. N. E.	Cloudy.....
26	24	20	4	8.40	9.30	.12	1.	N. N. E.	Cloudy.....
27	29	23	6	.....	.....	.....	.....	N. N. W.	Cloudy.....
28	32	25	7	.....	.....	.....	.....	N. W.	Cloudy.....
29	32	25	7	.....	.....	.....	.....	N. N. E.	Partly cloudy..
30	44	29	15	.....	.....	.....	.....	E. N. E.	Cloudy.....
31	40	15	25	8.40	.....	.64	.....	E. S. E.	Cloudy.....
Sum	963	394	.....	.....	.....	3.51	26	.....	.....
Mean	31.0	12.7	.....	.....	.....	.....	.....	.....	.....

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 31.0; Mean minimum, 12.7; Mean, 21.8; Maximum, 44; Date, 23 and 30; Minimum, -11; Date, 19; Greatest daily range, 40.

PRECIPITATION—Total, 3.51 inches; Greatest in 24 hours, .71; Date, 6.

SNOW—Total fall, 26 inches; on ground, 15th, 6.5 inches; at end of month, 14 inches.

NUMBER OF DAYS—With .01 inch or more precipitation, 11; Clear, 6; Partly cloudy, 7; Cloudy, 18.



## Meteorological Record: Month of January, 1907.

January, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	47	17	30					14.0	W. N. W. Cloudy
2	40	16	24						N. N. E. Cloudy
3	38	13	25						S. E. Cloudy
4	41	24	17						W. Cloudy
5	50	22	29						W. Cloudy
6	34	22	12						W. S. W. Cloudy
7	50	27	23						W. Cloudy
8	49	28	21	2.30 p. m.		.20	5.0		E. Cloudy
9	39	10	29	Night		.01	5.0		W. N. W. Cloudy
10	25	5	20				5.0		S. W. Cloudy
11	40	23	17				5.0		W. Partly cloudy
12	33	13	20	9.45 a. m.		.90	4.0	9.0	N. N. E. Cloudy
13	33	15	18					9.0	N. E. Partly cloudy
14	25	16	9		6.00 p. m.	.10	0.5	9.5	N. E. Cloudy
15	36	12	24						N. W. Cloudy
16	12	-6	18						N. W. Clear
17	12	-17	29			.02	1.0	10.0	N. N. W. Partly cloudy
18	25	3	22						N. N. W. Cloudy
19	34	15	19	11.30		.24		7.5	N. W. Cloudy
20	52	32	20						W. Partly cloudy
21	39	12	27						N. N. W. Clear
22	18	-1	19	9.30		.10	4.5	6.	N. N. W. Cloudy
23	13	-4	17						N. W. Clear
24	4	-24	28						N. W. Clear
25	9	-6	15	Night	3.00 p. m.	.25	4.5	7.5	N. W. Cloudy
26	18	7	11	Night	9.30	.48	6.	10.5	N. Partly cloudy
27	19	-5	24						N. N. E. Partly cloudy
28	26	7	19						N. W. Clear
29	26	-5	31						N. W. Partly cloudy
30	29	14	15						N. W. Clear
31	17	-11	28					10.5	N. W. Partly cloudy
Sum	933 30.1	274 8.8					20.5		

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 30.1; Mean minimum, 8.8; Mean, 19.5; Maximum, 52; Date, 20; Minimum, -24; Date, 24; Greatest daily range, 31, on 29th.

PRECIPITATION—Total, 2.3 inches; Greatest in 24 hours, .9; Date, 12.

SNOW—Total, 20.5 inches; on ground 15th, 9.5 inches; at end of month, 10.5 inches.

NUMBER OF DAYS—With .01 inch or more precipitation, 9; Clear, 6; Partly cloudy, 8; Cloudy, 17.

## Meteorological Record: Month of February, 1907.

February, 1907.	TEMPERATURE.			PRECIPITATION.				Depth of snow on ground at time of observation.	Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.			
1	29	13	16	3.30	Night	0.10	.25	10.75	N. E.	Cloudy.....
2	40	25	15			0.02		10.05	N. N. E.	Cloudy.....
3	40	16	24	Night	Night	.02		10.00	W. N. W.	Clear.....
4	16	12	4						W. N. W.	Cloudy.....
5	15	9	6	Night	3.00 p. m.	.34	4.	14.	N. E.	Cloudy.....
6	17	2	15					14.	N. W.	Partly cloudy.
7	25	4	29						S.	Clear.....
8	27	5	32						S.	Clear.....
9	29	4	25						S.	Clear.....
10	34	3	31			.08	.50	14.0	S.	Cloudy.....
11	35	15	20						W. N. W.	Partly cloudy.
12	16	1	15						W. N. W.	Partly cloudy.
13	21	1	20						W. N. W.	Partly cloudy.
14	50	14	36						S. W.	Partly cloudy.
15	49	24	19						W. N. W.	Clear.....
16	40	20	20						W.	Partly cloudy.
17	36	22	14	Night		.42	5.0	13.	N. N. W.	Cloudy.....
18	26	15	11		8.00 a. m.	.07	1.0	14.	N.	Partly cloudy.
19	34	4	30	1.30 p. m.	—	.22	1.5	15.	E. N. E.	Partly cloudy.
20	38	21	27	7.00 p. m.		.06	.75	14.75	N. E.	Partly cloudy.
21	38	19	19		Night	.05	.50	15	N. W.	Clear.....
22	19	3	16						N. W.	Clear.....
23	6	0	6						N. W.	Clear.....
24	18	-15	33	— p. m.	Night				N. W.	Partly cloudy.
25	32	11	21	Night	Night	.60	3.5	16.0	N. W.	Partly cloudy.
26	16	5	11						N. W.	Partly cloudy.
27	22	7	15						N. W.	Partly cloudy.
28	22	-11	33					12.0	S. W.	Partly cloudy.
29										
30										
31										
Sum	784	241				1.98	17			
Mean	28	8.6								

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 28; Mean minimum, 8.6; Mean, 18.3; Maximum, 50; Date, 14; Minimum, -15; Date, 24; Greatest daily range, 36, on 14th.

PRECIPITATION—Total, 1.98 inches; Greatest in 24 hours, .60; Date, 25th.

SNOW—Total fall, 17 inches; on ground, 15th, 9 inches; at end of month, 12 inches.

NUMBER OF DAYS—With .01 inch or more precipitation, 11; Clear, 8; Partly cloudy, 14; Cloudy, 6.

DATES OF—AURORAS, 7, 8, 9, and 11.

## Meteorological Record: Month of March, 1907.

March, 1907.	TEMPERATURE.			PRECIPITATION.					Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.		
1	23	0	23	Night	— a. m.			10.	S. W.	Cloudy .....
2	37	15	22						W.	Partly cloudy ..
3	37	27	10						N. W.	Clear .....
4	30	12	18						N. E.	Partly cloudy ..
5	32	14	18						N. N. E.	Clear .....
6	30	22	8						N.	Clear .....
7	33	12	21						N. W.	Clear .....
8	29	6	23			Trace			S. W.	Partly cloudy ..
9	31	24	7						N.	Partly cloudy ..
10	30	10	20						S. S. E.	Partly cloudy ..
11	41	20	21						N. W.	Clear .....
12	40	15	25						S. W.	Clear .....
13	44	34	10			Trace			N. W.	Partly cloudy ..
14	41	34	7	Night	Noon	.15			N. N. E.	Cloudy .....
15	43	35	8						W.	Partly cloudy ..
16	45	35	10						W.	Clear .....
17	55	30	25						W.	Partly cloudy ..
18	48	27	21						N. W.	Partly cloudy ..
19	34	21	13	Noon	Night	.34		7	S. S. E.	Cloudy .....
20	37	27	10		Night a. m.	.24		6.	N. W.	Cloudy .....
21	47	24	23						W. N. W.	Partly cloudy ..
22	45	32	13	10.00 a. m.	10.00 a. m.	Trace			S. E.	Cloudy .....
23	61	45	16						N.	Partly cloudy ..
24	48	27	21	Night	8.00 p. m	.48	5.5	5.5	N. E.	Cloudy .....
25	41	20	21			Trace			S. S. E.	Partly cloudy ..
26	54	23	31						W.	Cloudy .....
27	47	36	11						E. N. E.	Partly cloudy ..
28	57	34	23	Night	Night	.11			E. N. E.	Cloudy .....
29	66	42	24						S. E.	Partly cloudy ..
30	65	49	16						N. W.	Clear .....
31	56	39	17						N. W.	Partly cloudy ..
Sum	1327	791				1.32	11.5			
Mean	42.8	25.5								

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 42.8; Mean minimum, 25.5; Mean, 34.15; Maximum, 66; Date, 29; Minimum, 0; Date, 1; Greatest daily range, 31, on 26th.

PRECIPITATION—Total, 1.32 inches; Greatest in 24 hours, .48; Date, 24.

SNOW—Total fall, 12 inches; on ground, 15th, 8 inches; at end of month, none.

NUMBER OF DAYS—With .01 inch or more precipitation, 5; Clear, 8; Partly cloudy, 16; Cloudy, 7.

## Meteorological Record: Month of April, 1907.

April, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of Day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	43	29	14	Night				N.	Cloudy
2	39	30	9		Night	.43	4	N.	Partly cloudy
3	50	24	26					N. W.	Clear
4	55	25	30					S. E.	Clear
5	57	33	24	Night	10.30 a. m.	.15		N. W.	Partly cloudy
6	41	32	9					N.	Clear
7	36	21	15					S. E.	Partly cloudy
8	36	30	6	1.00 p. m.	Night	.52	4	N. E.	Cloudy
9	33	29	4			.85	6	N. E.	Cloudy
10	37	28	9		8.00 p. m.	.10	3.5	N.	Cloudy
11	49	31	18	Night	9.30 a. m.	.01		N.	Partly cloudy
12	44	24	20					N. W.	Partly cloudy
13	48	36	12	9.30 a. m.	11.30 a. m.	.09		N. W.	Cloudy
14	54	42	12					N. W.	Partly cloudy
15	46	35	11					N. W.	Partly cloudy
16	54	42	12					S.	Partly cloudy
17	48	32	9	Night	9.00 a. m.	.12		N. W.	Partly cloudy
18	50	37	13					N. W.	Clear
19	47	32	15			Trace		W. N. W.	Partly cloudy
20	46	32	14					N. W.	Partly cloudy
21	49	41	8					W.	Partly cloudy
22	64	29	35					S. W.	Partly cloudy
23	68	38	30			Trace		S.	Partly cloudy
24	53	47	6	Night	10.00 a. m.	.53		N. W.	Partly cloudy
25	69	35	34					N. E.	Partly cloudy
26	56	43	13			Trace		N. E.	Cloudy
27	59	43	16	Night	Night	.09		S. S. E.	Partly cloudy
28	51	30	21	3.00 p. m.	4.00 p. m.	.03		S. S. E.	Cloudy
29	57	39	18	7.00 a. m.	9.00 a. m.	.02		S. E.	Partly cloudy
30	76	50	26			Trace		S.	Partly cloudy
Sum	1515	1026				2.94	17.5		
Mean	50.5	34.2							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 50.5; Mean minimum, 34.2; Mean, 42.3; Maximum, 76; Date, 30; Minimum, 21; Date, 7; Greatest daily range, 35.

PRECIPITATION—Total, 2.94 inches; Greatest in 24 hours, .85; Date, 9.

SNOW—Total fall, 17½ inches; on ground, 15th, 60 inches; at end of month, none.

NUMBER OF DAYS—With .01 inch or more precipitation, 12; Clear, 4; Partly cloudy, 19; Cloudy, 7.

## Meteorological Record: Month of May, 1907.

May, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	66	50	16	.....	.....	.....	.....	S. E.	Partly cloudy..
2	52	37	15	.....	.....	.....	.....	S. E.	Clear.....
3	41	30	11	.....	.....	.....	.....	S. S. E.	Partly cloudy..
4	48	35	13	8.00 a. m.	3.30 p. m.	.37	.....	.....	Cloudy.....
5	56	44	12	8.00 a. m.	.....	.....	.....	W.	Clear.....
6	50	33	17	6.30 p. m.	.....	.05	.....	W. N. W.	Cloudy.....
7	53	41	12	Night	Night	.02	.....	S. S. E.	Cloudy.....
8	67	43	24	Night	Night	.03	.....	S. S. E.	Partly cloudy..
9	53	43	10	.....	.....	.....	.....	S. E.	Cloudy.....
10	70	51	19	.....	.....	Trace	.....	N. W.	Partly cloudy..
11	53	38	15	Night	1.30 p. m.	.25	.....	N. W.	Cloudy.....
12	57	45	12	Night	Night	.02	.....	W.	Partly cloudy..
13	80	42	38	.....	.....	.....	.....	S. W.	Partly cloudy..
14	75	48	27	.....	.....	.....	.....	S.	Partly cloudy..
15	53	43	10	.....	.....	.....	.....	S. S. E.	Partly cloudy..
16	60	44	16	Night	.....	.20	.....	S. E.	Cloudy.....
17	65	52	13	.....	9.30 a. m.	.30	.....	W. N. W.	Cloudy.....
18	69	41	28	.....	.....	.....	.....	S. E.	Partly cloudy..
19	70	49	31	1.30 p. m.	2.00 p. m.	.05	.....	N. N. E.	Partly cloudy..
20	67	48	19	.....	.....	.....	.....	N. W.	Partly cloudy..
21	50	43	7	.....	.....	.....	.....	N. W.	Partly cloudy..
22	58	36	12	.....	.....	.....	.....	N. W.	Partly cloudy..
23	64	33	31	.....	.....	.....	.....	S. E.	Partly cloudy..
24	64	38	26	.....	.....	.....	.....	N. W.	Partly cloudy..
25	61	38	23	.....	.....	.....	.....	S. S. E.	Partly cloudy..
26	58	31	27	1.00 p. m.	.....	.15	.....	S. E.	Partly cloudy..
27	46	44	2	.....	.....	.30	.....	E.	Cloudy.....
28	53	44	9	.....	Night	.09	.....	N. W.	Cloudy.....
29	56	50	6	.....	.....	.....	.....	N. W.	Partly cloudy..
30	63	42	21	5.45 p. m.	.....	.04	.....	E.	Cloudy.....
31	62	47	15	.....	Night	.02	.....	S. E.	Partly cloudy..
Sum	1840	1303	.....	.....	.....	1.89	.....	.....	.....
Mean	59.3	42.0	.....	.....	.....	.....	.....	.....	.....

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 59.3; Mean minimum, 42.0; Mean, 50.6; Maximum, 80; Date, 13; Minimum, 30; Date, 3; Greatest daily range, 38, on 13th.

PRECIPITATION—Total, 1.89 inches; Greatest in 24 hours, .37; Date, 4.

NUMBER OF DAYS—With .01 inch or more precipitation, 14; Clear, 2; Partly cloudy, 20; cloudy, 9.

DATES OF Killing frost, 23, 26.

## Meteorological Record: Month of June, 1907.

June, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	69	37	32					S.	Partly cloudy..
2	54	41	13	Noon		.39		E.	Cloudy.....
3	62	51	11		Noon	.25		N. E.	Cloudy.....
4	63	42	21	Night		.35		S. E.	Cloudy.....
5	54	48	6	9.45		.57		S. E.	Cloudy.....
6	57	34	23	3.25	4.10	.11		S. S. E.	Cloudy.....
7	65	35	30	11.00	11.30	.12		S. S. E.	Cloudy.....
8	71	39	32					E.	Cloudy.....
9	66	40	26	2.30	3.35	.14		E.	Cloudy.....
10	55	44	11					N. E.	Partly cloudy..
11	65	42	23					S. E.	Fair.....
12	73	39	34					E. S. E.	Fair.....
13	75	38	37					S. E.	Fair.....
14	76	46	30					S. E.	Fair.....
15	75	51	24	4.45	5.30	.01		S. E.	Fair.....
16	82	46	36					Variable	Fair.....
17	80	50	30					W. N. W.	Fair.....
18	94	62	32					S.	Fair.....
19	80	60	20					S. S. E.	Fair.....
20	75	58	17					S. E.	Partly cloudy..
21	84	62	22					Variable	Fair.....
22	84	56	28					Variable	Fair.....
23	86	54	32					S. E.	Fair.....
24	91	60	31					Variable	Fair.....
25	93	65	28	5.45	7.15	.09		S.	Fair.....
26	77	61	16	6.00	Night	.10		S.	Fair.....
27	73	65	8					W. N. W.	Cloudy.....
28	85	59	36					N. W.	Partly cloudy..
29	79	56	23					E.	Cloudy.....
30	73	55	18	8.00 p. m.	9.00 a. m.	.49		E.	Cloudy.....
Sum	2316	1386	750			2.62			
Mean	77.2	46.2	25						

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 77.2; Mean minimum, 46.2; Mean, 61.1; Maximum, 94; Date, 18; Minimum, 34; Date, 6; Greatest daily range, 37.

PRECIPITATION—Total, 2.62 inches; Greatest in 24 hours, .57; Date, 5.

NUMBER OF DAYS—With .01 inch or more precipitation, 11; Clear, 15; Partly cloudy, 4; Cloudy, 11.

DATES OF—Thunderstorms, 25, 26.



## Meteorological Record: Month of July, 1907.

July, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	80	69	11					S. W.	Cloudy
2	80	65	15					S. S. E.	Partly cloudy
3	73	60	13					S. E.	Fair
4	80	49	31					S. E.	Clear
5	83	49	34					S. E.	Clear
6	82	53	29	9.00 p. m.				S. E.	Clear
7	70	62	8	4.30, 5.30	8.00 a. m.	.77		E.	Cloudy
8	79	60	19					S. E.	Clear
9	82	62	20	11.30	1.00	.11		Variable	Partly cloudy
10	78	61	17					W.	Clear
11	76	55	21	2.30				E.	Cloudy
12	66	56	10		12.30 p. m.	.85		E.	Cloudy
13	80	59	21					W.	Clear
14	79	52	27					S. E.	Clear
15	76	55	21					S. E.	Clear
16	82	54	28					S. E.	Cloudy
17	89	60	29	5.30, 6.10	6.00, 8.00	.14		S.	Clear
18	92	69	23					W.	Clear
19	89	66	21					W.	Clear
20	86	61	25	Night	Night	.65		W.	Clear
21	78	62	16					N. W.	Clear
22	85	55	30	4.30	7.00	.10		W.	Partly cloudy
23	80	61	19	Morning		.01		W.	Partly cloudy
24	69	59	10	Night		.09		E.	Partly cloudy
25	79	57	22					W.	Partly cloudy
26	81	61	20	7.50	11 a. m.	.20		W.	Cloudy
27	75	60	15					W.	Partly cloudy
28	82	63	18					W.	Clear
29	88	60	28					S. W.	Clear
30	73	60	13					E.	Cloudy
31	82	59	23					W.	Clear
Sum	2521	1794	648			2.82			
Mean	81.	57.9	20.9						

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 81; Mean minimum, 58; Mean, 69.5; Maximum, 92; Date, 18; Minimum, 49; Date, 4, 5; Greatest daily range, 30.

PRECIPITATION—Total, 2.82 inches; Greatest in 24 hours, .85; Date, 12.

NUMBER OF DAYS—With .01 inch or more precipitation, 9; Clear, 15; Partly cloudy, 9; Cloudy, 5.

DATES OF—Thunderstorms, 7, 17, 20.

## Meteorological Record: Month of August, 1907.

August, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	86	55	21	4.00	About 6.00	.01		W.	Partly cloudy..
2	76	60	16					E.	Partly cloudy..
3	81	60	21					W.	Clear.....
4	70	56	14	7.00	9.30	.20		N. W.	Partly cloudy..
5	79	53	28						Clear.....
6	74	55	19	8.00	10.00	.10		S. E.	Partly cloudy..
7	82	54	28					S. E.	Partly cloudy..
8	85	58	27					S. E.	Clear.....
9	74	54	20					S. E.	Clear.....
10	91	55	36					S.	Clear.....
11	95	57	38					S.	Clear.....
12	94	65	29					S.	Clear.....
13	86	65	21					S.	Clear.....
14	76	60	16					W.	Clear.....
15	80	45	35					S. W.	Clear.....
16	81	39	42					S. W.	Partly cloudy..
17	74	60	14	10.00	11.30	.70		S. W.	Partly cloudy..
18	66	70	16	Night		.05		S. W.	Clear.....
19	80	39	41					S. W.	Clear.....
20	89	45	44					S. W.	Clear.....
21	76	55	21	10.30	5.00	.30		N. E.	Cloudy.....
22	71	54	17						
23	70	60	10					N. E.	Cloudy.....
24	71	41	30	6.10	7.30	.09		S. S. E.	Cloudy.....
25	69	49	20					N. N. W.	Cloudy.....
26	76	56	20					N. W.	Cloudy.....
27	75	45	30	Night		.09		W.	Clear.....
28	72	50	22					W.	Clear.....
29	72	48	24					N. W.	Partly cloudy..
30	72	52	20					N. W.	Partly cloudy..
31	70	52	18					N. E.	Partly cloudy..
Sum	2533	1667	756			1.54			
Mean	81	55	25						

† Including rain, hail, sleet and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 81; Mean minimum, 55; Mean, 63; Maximum, 95; Date, 11; Minimum, 39; Date, 16; Greatest daily range, 44.

PRECIPITATION—Total, 1.54 inches; Greatest in 24 hours, .70; Date, 17.

NUMBER OF DAYS—With .01 inch or more precipitation, 8; Clear, 15; Partly cloudy, 11; Cloudy, 5.

## Meteorological Record: Month of September, 1907.

September, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	75	45	30					S. E.	Partly cloudy..
2	65	44	21	12.00				S. E.	Cloudy .....
3	63	48	15		6.00 a. m.	1.97		S. E.	Cloudy .....
4	65	55	10					S. E.	Cloudy .....
5	78	56	22			.07		S. S. W.	Cloudy .....
6	78	60	18					W.	Partly cloudy..
7	76	61	15					W. N. W.	Partly cloudy..
8	68	53	15			.08		W.	Partly cloudy..
9	65	60	5					E.	Partly cloudy..
10	62	58	4			.03		E.	Partly cloudy..
11	73	59	14			.05		E.	Partly cloudy..
12	76	61	15			.20		S. S. W.	Partly cloudy..
13	77	67	10					W. N. W.	Partly cloudy..
14	68	59	9					S. S. E.	Clear.....
15	84	50	34					S. W.	Clear.....
16	77	59	18					N. W.	Partly cloudy..
17	79	60	19					N. W.	Partly cloudy..
18	62	44	18					S. E.	Clear.....
19	66	33	33					S. S. E.	Partly cloudy..
20	75	50	25					S. S. E.	Clear.....
21	82	62	20	Night		.10		S. S. E.	Partly cloudy..
22	77	63	14					W.	Partly cloudy..
23	64	51	13	—	—	1.95		N. N. W.	Cloudy .....
24	79	54	25	—	—	.97		N. W.	Cloudy .....
25	63	52	11					W. N. W.	Clear.....
26	55	42	13					W. N. W.	Partly cloudy..
27	63	35	28					W. N. W.	Partly cloudy..
28	64	52	22					N. E.	Cloudy .....
29	54	40	14			2.90		N. N. E.	Cloudy .....
30	55	42	13			.08		N. W.	Partly cloudy..
Sum	2088	1575				8.40			
Mean	69.6	52.5							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 69.6; Mean minimum, 52.5; Mean, 61; Maximum, 84; Date, 15; Minimum, 33; Date, 19; Greatest daily range, 34, on 15th.

PRECIPITATION—Total, 8.40 inches; Greatest in 24 hours, 2.90; Dates, 28, 29.

NUMBER OF DAYS—With .01 inch or more precipitation, 14; Clear, 5; Partly cloudy, 17; Cloudy, 8.

DATES OF—Killing frost, 19.

## Meteorological Record: Month of October, 1907.

October, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	58	44	14					N. W.	Partly cloudy..
2	63	38	25					N. W.	Partly cloudy..
3	63	35	28					N. S. E.	Cloudy .....
4	68	49	19	Night	11.00	.65		N. W.	Partly cloudy..
5	64	34	30	12.00	6.00	.02		N. W.	Partly cloudy..
6	58	44	14					N. W.	Partly cloudy..
7	60	43	26	Night	Night	.11		N. S. E.	Partly cloudy..
8	67	42	25	Night	Noon	.87		N. S. W.	Partly cloudy..
9	57	33	24					N. S. E.	Clear.....
10	52	27	25					N. S. E.	Clear.....
11	56	41	15					N. S. E.	Partly cloudy..
12	63	44	19					N. W.	Partly cloudy..
13	60	36	24					N. E.	Partly cloudy..
14	62	48	14					N. W.	Partly cloudy..
15	55	32	23					N. W.	Clear.....
16	65	34	31					N. S. W.	Clear.....
17	73	35	38					N. S. W.	Clear.....
18	68	43	25					N. W.	Partly cloudy..
19	44	32	12					N. W.	Partly cloudy..
20	44	27	17	8.00 a. m.		.02		N. S. W.	Cloudy .....
21	39	30	9			.23		N. S. W.	Clear.....
22	56	23	33					N. W.	Partly cloudy..
23	54	42	12					N. W.	Partly cloudy..
24	46	35	11					N. W.	Partly cloudy..
25	51	29	31					N. S. W.	Partly cloudy..
26	47	28	19					N. W.	Clear.....
27	48	19	29			Trace		N. S. E.	Partly cloudy..
28	67	57	10			.40		N. S. E.	Cloudy .....
29	54	39	15			1.13		N. W.	Cloudy .....
30	40	31	9					N. W.	Partly cloudy..
31	55	25	30					N. E.	Clear.....
Sum	1747	1110				3.53			
Mean	56.4	35.8							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 56.4; Mean minimum, 35.8; Mean, 46.1; Maximum, 73; Date, 17; Minimum, 19; Date, 27; Greatest daily range, 38, on 17th.

PRECIPITATION—Total, 3.53 inches; Greatest in 24 hours, 1.13; Date, 29.

NUMBER OF DAYS—With .01 inch or more precipitation, 8; Clear, 8; Partly cloudy, 19; Cloudy, 4.

## Meterological Record: Month of November, 1907.

November, 1907.	TEMPERATURE.			PRECIPITATION.					Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.		
1	58	23	35						S. S. E.	Clear.....
2	52	35	17	7.00	Morning	Trace			S. S. E.	Cloudy.....
3	52	48	4	Night		.65			N. W.	Partly cloudy..
4	50	36	14						N. W.	Clear.....
5	46	23	23						S. S. E.	Clear.....
6	52	37	15	8.30		1.20			N. E.	Cloudy.....
7	52	40	12		4.00 p. m.	.50			S. W.	Cloudy.....
8	53	41	12						S. W.	Partly cloudy..
9	56	29	27						S. S. W.	Clear.....
10	47	31	16	Night	6.00 p. m.	.45			S. S. W.	Cloudy.....
11	47	38	9						N. W.	Partly cloudy..
12	39	21	18						N. W.	Clear.....
13	40	30	10						N. W.	Partly cloudy..
14	37	25	12						N. W.	Clear.....
15	41	18	23						S. W.	Partly cloudy..
16	44	18	26						S. S. E.	Clear.....
17	44	28	16						N. W.	Clear.....
18	44	21	23						S. W.	Partly cloudy..
19	50	21	29						N. N. E.	Clear.....
20	43	26	17						E.	Clear.....
21	42	26	16			.12			E.	Cloudy.....
22	54	40	14			.02	2		E.	Partly cloudy..
23	50	37	13			1.40			N. W.	Clear.....
24	44	30	14						N. E.	Cloudy.....
25	37	34	3						N. N. E.	Cloudy.....
26	40	32	8						N.	Cloudy.....
27	38	33	5			.04	1 $\frac{1}{2}$	1 $\frac{1}{2}$	N. N. W.	Partly cloudy..
28	35	25	10			Trace			N. W.	Cloudy.....
29	38	27	11						N. W.	Clear.....
30	34	18	16						N. W.	Clear.....
Sum	1359	891				4.38	21 $\frac{1}{2}$			
Mean	45.3	29.7								

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum—45.3; Mean minimum, 29.7; Mean, 37.5; Maximum, 58; Date, 1; Minimum, 18; Date, 15, 16, 30; Greatest daily range, 35, on 1st.

PRECIPITATION—Total, 4.38 inches; Greatest in 24 hours, 1.4; Date, 23.

SNOW—Total fall, 2 $\frac{1}{2}$  inches; on ground 15th, none; at end of month, 1 inch.

NUMBER OF DAYS—With .01 inch or more precipitation, 8; Clear, 12; Partly cloudy, 9; Cloudy, 9.

DATES OF—Thunderstorms, 6.

## Meteorological Record: Month of December, 1907.

December, 1907.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	30	19	11	4.00 p. m.	Night	Trace			N. N. W. Cloudy
2	30	21	9			.03			N. W. Partly cloudy
3	33	20	13						N. W. Clear
4	25	20	5	Night	2.00 p. m.	.05	1		N. W. Cloudy
5	30	20	10						N. W. Clear
6	38	23	15						N. W. Clear
7	44	24	20						N. W. Clear
8	44	17	27						N. W. Clear
9	48	19	29						S. S. W. Partly cloudy
10	62	41	21	Night		1.24			S. Cloudy
11	50	40	10		Night	.14			S. Partly cloudy
12	55	25	30						N. W. Partly cloudy
13	33	25	8						N. W. Partly cloudy
14	28	18	10	1.30		.35	3½	3½	N. E. Cloudy
15	33	19	4			.53	5½	9	N. W. E. Cloudy
16	34	26	8		Night	.03			N. W. Cloudy
17	36	30	6						N. W. Cloudy
18	37	28	9						N. W. Partly cloudy
19	36	21	15						N. W. Partly cloudy
20	39	20	19						S. W. Cloudy
21	38	21	17						N. N. W. Clear
22	45	16	29						S. S. W. Clear
23	46	21	25	10.15	3.00	.45			N. E. Cloudy
24	44	34	10						W. Cloudy
25	40	24	16						S. W. Cloudy
26	42	29	13						N. W. Cloudy
27	44	17	27						W. S. W. Cloudy
28	52	38	14						N. W. Cloudy
29	37	27	10						W. Clear
30	43	25	18	10.45	4.00	.77			W. Cloudy
31	42	23	19						N. W. N. Clear
Sum	1218	751				3.59	10		
Mean	39.3	24.2							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 39.3; Mean minimum, 24.2; Mean, 31.7; Maximum, 62; Date, 10; Minimum, 16; Date, 22; Greatest daily range, 30, on 12th.

PRECIPITATION—Total, 3.59 inches; Greatest in 24 hours, 1.24, Date, 10.

SNOW—Total fall, 10 inches; on ground 15th, 9 inches; at end of month, none.

NUMBER OF DAYS—With .01 inch or more precipitation, 9; Clear, 9; Partly cloudy, 7; Cloudy, 15.

DATES OF—Auroras, 22.



## Meteorological Record: Month of January, 1908.

January, 1908.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	41	22	19					W. N. W.	Clear .....
2	38	23	15					N. N. W.	Clear .....
3	32	22	10					N. W.	Clear .....
4	34	17	17					W. N. W.	Partly cloudy..
5	36	12	24	6.00 p. m.	7.50 p. m.	.12		W. S. W.	Cloudy .....
6	33	13	25					W. N. W.	Partly cloudy..
7	36	8	23			1.90		W.	Clear .....
8	50	33	17			.09		S. W.	Clear .....
9	39	25	14					N. W.	Partly cloudy..
10	31	15	16					N. W.	Partly cloudy..
11	37	12	25					N. W.	Partly cloudy..
12	40	24	16	Night	—	1.17		N. N. E.	Cloudy .....
13	46	34	12					N. W.	Partly cloudy..
14	36	15	21					N. W.	Partly cloudy..
15	29	13	16					W. N. W.	Partly cloudy..
16	40	31	9					N. W.	Partly cloudy..
17	33	8	21					S. W.	Partly cloudy..
18	37	27	10					W.	Clear .....
19	33	7	26					N. N. W.	Clear .....
20	31	1	30					S. W.	Partly cloudy..
21	53	26	27					S.	Partly cloudy..
22	53	38	15					W. N. W.	Clear .....
23	39	22	17					N. E.	Partly cloudy..
24	24	9	15				T	N. E.	Cloudy .....
25	31	20	11					N. W.	Partly cloudy..
26	41	27	14					S. S. E.	Partly cloudy..
27	47	23	24			.16		W.	Partly cloudy..
28	33	20	13			.04		N. W.	Partly cloudy..
29	37	23	14					N. W.	Partly cloudy..
30	20	-2	22					N. W.	Clear .....
31	16	-6	22					N. W.	Clear .....
Sum	1126	561*				4.48			
Mean	36.3	18.1							

\* Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 36.3; Mean minimum, 18.1; Mean, 27.2; Maximum, 53; Date, 21, 22; Minimum, -6; Date, 31; Greatest daily range, 30, on 20th.

PRECIPITATION—Total, 4.48 inches; Greatest in 24 hours, 1.90; Date, 7.

SNOW—Total fall, none; on ground 15th, none; at end of month, none.

NUMBER OF DAYS—With .01 inch or more precipitation, 6; Clear, 10; Partly cloudy, 18; Cloudy, 3.

DATES OF—AURORAS, 6.

## Meteorological Record: Month of February, 1908.

February, 1908.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	
1	44	36	8	.....	.....	.....	.....	.....	W. S. W. Cloudy.....
2	37	27	10	.....	.....	.....	.....	.....	W. Clear.....
3	22	12	10	.....	.....	.....	.....	.....	W. Partly cloudy..
4	23	13	10	.....	.....	.....	.....	.....	W. S. W. Clear.....
5	16	-11	27	.....	.....	.....	.....	.....	W. Partly cloudy..
6	34	18	16	Night	10.30	.66	6	6	E. N. E. Cloudy.....
7	35	20	15	.....	.....	.....	.....	.....	W. N. W. Partly cloudy..
8	31	15	16	.....	.....	.....	.....	.....	W. Clear.....
9	15	4	11	.....	.....	.....	.....	.....	W. Clear.....
10	33	14	19	.....	.....	.....	.....	.....	W. Partly cloudy..
11	40	25	15	.....	.....	.....	.....	.....	N. W. Partly cloudy..
12	35	13	22	.....	.....	.....	.....	.....	N. N. W. Partly cloudy..
13	35	14	21	.....	.....	.....	.....	.....	S. W. Cloudy.....
14	46	34	12	.....	.....	.....	.....	.....	E. S. E. Cloudy.....
15	58	33	25	12.00 m.	.....	.37	.....	.....	S. W. Cloudy.....
16	55	27	28	.....	.....	Trace	.....	.....	W. N. W. Partly cloudy..
17	35	19	16	.....	.....	.05	.....	.....	W. N. W. Cloudy.....
18	25	14	11	.....	.....	Trace	.....	.....	N. W. Clear.....
19	22	9	13	.....	.....	.94	7	7	N. N. E. Cloudy.....
20	34	20	14	.....	.....	.....	.....	.....	N. W. Partly cloudy..
21	40	10	30	.....	.....	.....	.....	.....	S. W. Clear.....
22	33	18	15	.....	.....	.....	.....	.....	N. W. Clear.....
23	25	-2	27	.....	.....	.....	.....	.....	W. S. W. Partly cloudy..
24	28	12	16	.....	.....	.....	.....	.....	N. W. Clear.....
25	30	13	17	.....	.....	.....	.....	.....	S. S. E. Partly cloudy..
26	36	27	9	6.00 p. m.	Night	.15	5	.....	E. S. E. Partly cloudy..
27	39	30	9	8.00 a. m.	5.00 p. m.	.31	.....	.....	N. W. Cloudy.....
28	39	26	13	.....	.....	.....	.....	.....	N. W. Partly cloudy..
29	28	12	16	.....	.....	.....	.....	.....	N. W. Partly cloudy..
Sum	973	396	.....	.....	.....	2.38	18	.....	.....
Mean	33.5	13.6	.....	.....	.....	.....	.....	.....	.....

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 33.5; Mean minimum, 13.6; Mean, 23.6; Maximum, 58; Date, 15; Minimum, -11; Date, 5; Greatest daily range, 37, on 10th.

PRECIPITATION—Total, 2.38 inches; Greatest in 24 hours, .94; Date, 19.

SNOW—Total fall, 18 inches; on ground 15th, none; at end of month, 7 inches.

NUMBER OF DAYS—With .01 inch or more precipitation, 6; Clear, 8; Partly cloudy, 13; Cloudy, 8.

## Meteorological Record: Month of March, 1908.

March, 1908.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snow fall in inches.		
1	32	11	21					S.	Partly cloudy..
2	32	21	11	Night	—	.74		N. N. E.	Cloudy.....
3	35	18	17			Trace		N. W.	Cloudy.....
4	32	17	15					E. S. E.	Partly cloudy..
5	33	16	17					S. S. W.	Partly cloudy..
6	31	8	23	3.30 p. m.		.10	6	S. E.	Cloudy.....
7	42	27	15					N. N. W.	Cloudy.....
8	41	27	14					W. S. W.	Partly cloudy..
9	42	23	19					N. N. W.	Partly cloudy..
10	24	11	13					N. W.	Clear.....
11	50	7	43			Trace		W. S. W.	Partly cloudy..
12	51	36	15					S.	Partly cloudy..
13	45	27	18					S.	Partly cloudy..
14	55	35	20					N. W.	Clear.....
15	56	31	25	7.00 p. m.		.63		S.	Cloudy.....
16	50	28	22			Trace		W. N. W.	Partly cloudy..
17	31	15	16	5.00 p. m.		.65		W.	Partly cloudy..
18	34	24	10					S. S. W.	Cloudy.....
19	41	31	10	Night		.17		N. W.	Partly cloudy..
20	34	25	9					N. W.	Partly cloudy..
21	41	14	28					N. W.	Clear.....
22	49	24	25					W. S. W.	Partly cloudy..
23	57	36	21	4.00 p. m.		.15		W. S.	Partly cloudy..
24	55	37	18					W. S. W.	Clear.....
25	42	20	22					N. W.	Clear.....
26	62	18	44					S. W.	Partly cloudy..
27	61	38	23					E. S. E.	Cloudy.....
28	64	35	29			Trace		S. W.	Partly cloudy..
29	60	35	25			.30		N.	Cloudy.....
30	45	37	8					N. W.	Partly cloudy..
31	51	23	28					S. W.	Partly cloudy..
Sum	1379	755				1.54			
Mean	27.0	14.8							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 27.0; Mean minimum, 14.8; Mean, 20.9; Maximum, 64; Date, 28; Minimum, 7; Date, 11; Greatest daily range, 44, on 26th.

PRECIPITATION—Total, 1.54 inches; Greatest in 24 hours, .74; Date, 2.

SNOW—Total fall, none; on ground 15th, traces; at end of month, none.

NUMBER OF DAYS—With .01 inch or more precipitation, 7; Clear, 5; Partly cloudy, 18; Cloudy, 8.

DATES OF—Thunderstorms, 15, 29.

## Meteorological Record: Month of April, 1908.

April, 1908.	TEMPERATURE.			PRECIPITATION.					Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.		
1	46	32	14						E.	Clear .....
2	45	30	15	Night	9.50	.13	.25		W. N. W.	Partly cloudy..
3	35	25	10						N. W.	Partly cloudy..
4	30	21	9						N. W.	Clear .....
5	50	30	20						S. W.	Clear .....
6	60	49	11						W. S. W.	Clear .....
7	61	46	15						N.	Clear .....
8	48	31	17			.65			E.	Cloudy.....
9	45	32	13						N. W.	Clear .....
10	63	28	35						S. W.	Partly cloudy..
11	61	37	24	10.00 a. m.	12.00 m.	Trace			W.	Partly cloudy..
12	45	37	8						N. W.	Clear .....
13	47	34	13						N. N. W.	Clear .....
14	50	28	22						S.	Clear .....
15	59	36	23	12.00 m.	5.30 p. m.	.04			W. S. W.	Partly cloudy..
16	53	26	27						N. W.	Cloudy.....
17	52	20	32						N. W.	Partly cloudy..
18	57	28	29	3.00 p. m.		.13			N. E.	Cloudy.....
19	51	40	11	Night	Night	.19			N. W.	Cloudy.....
20	42	28	14	12.00 m.	3.30	Trace			N. W.	Cloudy.....
21	39	34	5						N. W.	Partly cloudy..
22	50	38	12						W.	Partly cloudy..
23	80	45	35						E.	Partly cloudy..
24	59	40	19						S.	Partly cloudy..
25	57	39	18						N. E.	Partly cloudy..
26	82	50	32						W. N. W.	Partly cloudy..
27	72	50	22						S. S. E.	Partly cloudy..
28	51	43	8	Night	Night	.07			N. E.	Partly cloudy..
29	67	43	24						N. W.	Partly cloudy..
30	62	39	23						E.	Partly cloudy..
Sum	1618	1059				1.21				
Mean	53.7	35.3								

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 53.7; Mean minimum, 35.3; Mean, 44.5; Maximum, 82; Date, 26; Minimum, 20; Date, 17; Greatest daily range, 35, on 10th and 23rd.

PRECIPITATION—Total, 1.21 inches; Greatest in 24 hours, .65; Date, 19.

NUMBER OF DAYS—With .01 inch or more precipitation, 5; Clear, 9; Partly cloudy, 16; Cloudy, 5.

## Meteorological Record: Month of May, 1908.

May, 1908.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	64	42	22	Night	Night	.19		W. S. W.	Partly cloudy..
2	60	31	29	2.30 p. m.	5.00 p. m.	.12		S. E.	Partly cloudy..
3	54	42	12	Night	12.30	.08		N.	Cloudy.....
4	52	41	11					S. E.	Partly cloudy..
5	60	48	12						
6	50	42	8						
7	46	40	6						
8	50	48	2		Night	1.01		N. E.	Cloudy.....
9	62	44	18	Night	7.00 p. m.	.01		W.	Cloudy.....
10	57	46	11			Trace		N. W.	Partly cloudy..
11	79	62	17					W. N. W.	Partly cloudy..
12	85	61	24	3.00 p. m.	3.15 p. m.	.01		W.	Partly cloudy..
13	78	52	26					S. S. E.	Partly cloudy..
14	57	43	14	Night	1.30 p. m.	.42		W. S. W.	Cloudy.....
15	63	48	15			Trace		S. W.	Partly cloudy..
16	64	47	17	Night	Night	.01		S. S. E.	Cloudy.....
17	75	47	28					N. W.	Cloudy.....
18	74	52	32					S. S. E.	Clear.....
19	76	41	35					S.	Clear.....
20	68	42	26			Trace		S. E.	Partly cloudy..
21	73	52	21			Trace		S. E.	Partly cloudy..
22	59	52	7	Night	6.00 p. m.	.38		S. E.	Cloudy.....
23	69	51	18	Night	Night	.21		S. E.	Partly cloudy..
24	82	57	25					S. E.	Clear.....
25	71	52	19					S. S. E.	Clear.....
26	91	45	46					S. W.	Clear.....
27	86	69	17	Night	Night	.01		W. N. W.	Clear.....
28	75	47	28					E.	Partly cloudy..
29	76	47	29	Night	Night	.03		E. S. E.	Partly cloudy..
30	71	52	19	3.30 p. m.		.19		E. N. E.	Cloudy.....
31	81	59	22		Night	1.87		S. W.	Partly cloudy..
Sum.	2108	1502				4.54			
Mean	68.	48.4							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE.—Mean maximum, 68.; Mean minimum, 48.4; Mean, 58.2; Maximum, 91; Date, 26; Minimum, 31; Date, 2; Greatest daily range, 46, on 26th.

PRECIPITATION.—Total, 4.54 inches; Greatest in 24 hours, 1.87; Date, 31.

NUMBER OF DAYS.—With .01 inch or more precipitation, 14; Clear, 00; Partly cloudy, 00; Cloudy, 00.

DATES OF.—Killing frost, 4.

## Meteorological Record: Month of June, 1908.

June, 1908.	TEMPERATURE.			PRECIPITATION.				Prevailing wind direction.	Character of day.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Amount.	Snowfall in inches.		
1	71	56	15	10.00 a. m.		.44		N. E.	Cloudy.....
2	67	40	27					N. W.	Clear.....
3	68	57	11					E. S. E.	Cloudy.....
4	74	48	26			.08		E. S. E.	Partly cloudy..
5	64	48	16					E. S. E.	Clear.....
6	79	36	43					S. W.	Clear.....
7	88	47	41					W.	Clear.....
8	92	56	36					S. W.	Clear.....
9	90	62	28					W.	Clear.....
10	86	58	28					W. S. W.	Clear.....
11	76	54	22					W.	Clear.....
12	75	53	22					N. W.	Clear.....
13	84	51	33					S. E.	Clear.....
14	87	52	35					S. E.	Clear.....
15	80	61	19					S.	Partly cloudy..
16	71	57	14	5.00 a. m.	10.00 a. m.	.38		N. W.	Partly cloudy..
17	69	56	13					N. W.	Clear.....
18	80	39	41					W. N. W.	Clear.....
19	88	50	38					S. W.	Clear.....
20	89	70	19					W.	Clear.....
21	82	60	22					W.	Clear.....
22	80	55	25					W. N. W.	Clear.....
23	73	57	16					E. S. E.	Cloudy.....
24	77	56	21	5.00 a. m.		.05		E. S. E.	Cloudy.....
25	81	69	12					N. W.	Clear.....
26	80	51	29					S. E.	Clear.....
27	83	47	36					S.	Clear.....
28	79	55	24					S.	Clear.....
29	85	55	30	4.00 p. m.	5.00 p. m.	.01		S. S. W.	Cloudy.....
30	88	55	33					S. W.	Clear.....
Sum	2386	1611				.96			
Mean	79.5	53.7							

† Including rain, hail, sleet, and melted snow.

## MONTHLY SUMMARY.

TEMPERATURE—Mean maximum, 79.5; Mean minimum, 53.7; Mean, 66.6; Maximum, 92; Date, 8; Minimum, 36; Date, 6; Greatest daily range, 43.

PRECIPITATION—Total, .96 inches; Greatest in 24 hours, .44; Date, 1st.

NUMBER OF DAYS—With .01 inch or more precipitation, 5; Clear, 22; Partly cloudy, 3; Cloudy, 5.



## METEOROLOGICAL SUMMARY.—1907-1908.

MONTHS.	AVERAGE TEMPERATURE.		PRECIPITATION.		SNOW IN INCHES.		NUMBER OF DAYS 40 INCH PRECIPITATION.	
	1906-1907.	1907-1908.	Average, 1908, to June 30.	1906-1907.	1907-1908.	Average, 1908, to June 30.	1906-1907.	1907-1908.
July 1, 1897, to June 30, 1908.	62.3	68.9	3.30	3.56	2.82	.....	11	9
August.....	64.8	63.	2.90	2.87	1.54	.....	10	8
September.....	59.9	61.9	4.35	1.14	8.40	.....	6	14
October.....	48.4	50.4	2.33	2.33	3.53	.....	8	8
November.....	36.7	35.8	3.49	3.41	4.38	.....	11	8
December.....	25.4	31.7	3.85	3.51	3.59	.....	9	9
January.....	21.4	19.5	4.52	2.30	4.48	.....	11	6
February.....	22.1	18.3	3.31	1.98	2.38	.....	9	6
March.....	31.1	34.2	4.24	1.32	1.54	.....	5	7
April.....	43.5	42.3	3.47	2.94	1.21	.....	12	5
May.....	55.3	50.6	2.89	1.89	4.54	.....	14	14
June.....	62.9	61.1	4.05	2.62	.96	.....	11	5
Sum.....	540.8	565.0	43.92	29.57	39.37	56.0	99	99
Mean.....	45.1	45.6	45.8	45.8	45.8	45.8	45.8	45.8

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- No. \*35. The codling moth and apple maggot. Weed, C. M. May, 1896. 6p.
- No. 36. \* Analysis of three common insecticides. Morse, F. W. June, 1896. 4p.
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ANNUAL REPORTS

NOVEMBER 1, 1906 TO NOVEMBER 1, 1908

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NEW HAMPSHIRE COLLEGE  
OF  
AGRICULTURE AND THE MECHANIC ARTS  
DURHAM, N. H.



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TWENTY-FIRST REPORT  
(SEVENTH BIENNIAL)  
RELATING TO THE  
REGISTRATION AND RETURN  
OF  
BIRTHS, MARRIAGES, DIVORCES  
AND DEATHS  
IN  
NEW HAMPSHIRE

FOR THE YEARS 1906 AND 1907

---

VOLUME XVIII, NEW SERIES

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CONCORD, NEW HAMPSHIRE

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# THE STATE OF NEW HAMPSHIRE.

---

OFFICE OF THE REGISTRAR OF VITAL STATISTICS.

CONCORD, September 1, 1908.

*To His Excellency the Governor and the Honorable Council:*

I have the honor to submit herewith, in accordance with the laws of the State of New Hampshire, the twenty-first report relating to the registration of births, marriages, divorces and deaths, in this state for the years ending December 31, 1906, and December 31, 1907.

Respectfully submitted,

*Irving A. Watson*

*Registrar of Vital Statistics.*

# REGISTRATION REPORT.

## RETURNS FOR 1906 AND 1907.

Herewith is rendered a statistical return of births, marriages, divorces and deaths, as made to the department of vital statistics for the calendar years 1906 and 1907.

In addition thereto there is a summary, commencing with Table No. 19, showing certain features of similar returns for the past twenty-four years: since such statistics have been of sufficient completeness to be of value. Most of the computations are based upon an estimated population, except for the census years. Upon this basis, the population of the State of New Hampshire for the year 1906 was 333,488, and for the year 1907, 437,138.

The number of births, marriages, divorces and deaths returned to the state for the years 1906 and 1907 was as follows:

	1906.	1907.	Increase.	Decrease.
Births.....	9,234	9,083	.....	151
Marriages.....	4,378	4,546	168	.....
Divorces.....	475	522	.....	47
Deaths.....	7,498	7,486	12	.....

The proportion of births, marriages, divorces and deaths to each 1,000 of the population for the two years mentioned was:

Year.	Births.	Marriages.	Divorces.	Deaths.
1906.....	21.30	10.09 (couples)	1.09 (couples)	17.29
1907.....	20.77	10.37 (couples)	1.17 (couples)	17.12

In 1907, 9,083 births were returned, a decrease of 151 over the returns of the previous year, but a larger number than ever before returned to the state with the single exception of 1906. Table No. 21, on page 305, shows the number of births returned to the department of vital statistics each year since 1880. The proportion of births to the population in the earlier years of the registration is doubtless due to defective returns. For recent years the figures may be considered approximately correct, although under all systems of registration, so far as we know, some births are never reported.

Reference to various other tables relating to births will be found in the index.

During the year 1907 there were reported 4,546 marriages, the largest number ever returned to the state, being 168 more than in 1906.

Table No. 22 shows the number of marriages returned in each year from 1880 to 1907, inclusive. Some of the subsequent tables give the percentage of marriages to population, by state, counties, nativity, etc.

The number of divorces decreed in New Hampshire for thirty-seven years is given in Table No. 32, page 314.

Table No. 33, on page 316, gives the causes for which divorces were granted in New Hampshire from 1882 to 1907, inclusive, by counties, and Table No. 34 shows the ratio of divorces to marriages for the same period.

Tables Nos. 35 and 36 show the ratio of divorces to marriages, by counties, for the years 1906 and 1907.

#### DEATHS.

The general basic tables of this report show births, marriages, and deaths, by towns, and with more details than can be enumerated here. Every fact is recorded by towns, so that it is possible to locate, by the smallest geographical unit, every cause of death. This, from the standpoint of the student of the prevalence of certain diseases, is exceedingly important.

In other tables deaths are also enumerated by ages, sex,

months, counties and towns. A general summary of deaths in general and of certain specific causes, is given in Tables Nos. 37 to 63, inclusive.

Table No. 48, on page 331, shows various causes of death for the past twenty-four years, and is worthy of careful study, as are also some of the subsequent tables relating to special diseases.



TABLE OF BIRTHS, MARRIAGES,  
DIVORCES AND DEATHS,  
1906.



Table

Births, Marriages, and Deaths for  
Rockingham

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Atkinson.....	442	4	3	..	7	15.83	6	...	1	...	..
Auburn.....	682	6	5	..	11	16.12	7	...	1	1	2
Brentwood.....	957	5	7	..	12	12.54	5	...	4	2	1
Candia.....	1,057	14	13	..	27	25.54	12	7	4	4	..
Chester.....	861	5	8	..	13	15.09	12	...	...	1	..
Danville.....	615	3	3	..	6	9.75	6	...	...	...	..
Deerfield.....	1,162	11	4	..	15	12.90	10	2	1	1	1
Derry.....	3,583	56	54	..	110	30.70	60	23	11	14	2
East Kingston.....	496	3	4	..	7	14.11	5	...	2	...	..
Epping.....	1,641	28	27	..	55	33.51	26	23	5	1	..
Exeter.....	4,922	47	60	1	108	21.94	48	35	9	14	2
Fremont.....	749	4	8	..	12	16.02	8	1	1	...	2
Greenland.....	607	8	4	..	12	19.76	8	...	1	2	1
Hampstead.....	823	8	6	..	14	17.01	12	...	2	...	..
Hampton.....	1,209	6	6	..	12	9.92	9	...	1	2	..
Hampton Falls.....	560	4	6	..	10	17.85	8	1	1	...	..
Kensington.....	524	4	2	..	6	11.45	4	1	...	...	1
Kingston.....	1,132	14	5	..	19	16.78	15	...	...	2	2
Londonderry.....	1,408	8	18	..	26	18.46	17	3	3	2	1
Newcastle.....	581	3	2	..	5	8.61	4	...	...	1	..
Newfields.....	647	1	...	..	1	1.54	1	...	...	...	..
Newington.....	390	3	2	..	5	12.82	2	1	...	2	..
Newmarket.....	2,892	49	39	..	88	30.42	16	58	5	6	3
Newton.....	924	7	7	..	14	15.15	9	1	3	1	..
North Hampton.....	812	8	8	..	16	19.70	9	2	3	1	1
Northwood.....	1,304	7	7	..	14	10.73	11	1	...	...	2
Nottingham.....	638	3	3	..	6	9.40	3	1	1	...	1
Plaistow.....	1,027	9	13	..	22	21.42	12	6	1	3	..
Portsmouth.....	10,637	131	131	7	269	25.28	142	78	22	23	4
Raymond.....	1,100	8	6	..	14	12.72	13	...	...	...	..
Rye.....	1,142	5	6	..	11	9.63	6	1	2	2	..
Salem.....	2,041	18	11	..	29	14.20	13	6	4	6	..
Sandown.....	400	4	9	..	13	32.50	9	2	...	2	..
Seabrook.....	1,497	13	23	..	36	24.04	32	2	...	1	1
South Hampton.....	297	1	1	..	2	6.73	2	...	...	...	..
Stratham.....	718	3	6	..	9	12.53	8	1	...	...	..
Windham.....	641	5	2	..	7	10.92	5	1	1	...	..
Total.....	51,118	516	519	8	1,043	20.49	575	257	90	94	27

No. 1.

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			Death-rate per 1,000.
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	
.....	.....	1	.....	.....	1	6	2	.....	8	8	.....	.....	18.09
8	1	.....	1	.....	10	14	7	.....	21	19	2	.....	30.79
1	.....	.....	2	.....	3	21	20	.....	*41	30	8	3	42.84
4	1	.....	.....	.....	5	10	12	.....	22	17	5	.....	20.81
1	.....	2	.....	.....	3	4	4	.....	8	8	.....	.....	9.29
3	.....	1	.....	.....	4	4	3	.....	7	7	.....	.....	11.38
4	.....	.....	1	.....	5	15	9	.....	24	22	1	1	20.65
45	12	10	6	2	75	36	31	.....	67	59	8	.....	18.69
2	.....	.....	.....	.....	3	2	5	.....	7	7	.....	.....	14.11
7	2	1	3	.....	13	25	7	.....	32	23	4	5	19.50
26	9	7	5	.....	47	30	46	.....	76	57	14	5	15.44
7	.....	.....	1	.....	8	4	3	.....	7	7	.....	.....	9.34
5	.....	.....	.....	.....	5	6	3	.....	9	9	.....	.....	14.82
11	.....	.....	1	.....	12	8	4	.....	12	7	2	3	14.58
5	.....	.....	.....	.....	5	15	16	.....	31	30	.....	1	25.64
3	1	.....	.....	.....	4	.....	4	.....	4	3	.....	1	7.14
.....	.....	.....	.....	.....	.....	7	7	.....	14	6	.....	8	26.70
10	.....	.....	.....	.....	10	8	8	.....	16	16	.....	.....	14.13
8	.....	1	1	.....	10	10	12	.....	22	17	2	3	15.62
1	.....	.....	.....	.....	1	5	.....	.....	5	5	.....	.....	8.61
4	.....	.....	.....	.....	4	6	7	.....	13	12	1	.....	20.09
1	.....	.....	.....	.....	1	4	5	.....	9	6	2	1	23.07
11	16	1	5	.....	33	18	28	.....	46	35	10	1	15.90
5	.....	1	.....	.....	6	3	5	.....	8	8	.....	.....	8.65
2	.....	1	1	.....	4	6	7	.....	13	13	.....	.....	16.00
4	.....	1	.....	.....	5	10	13	.....	23	19	2	2	17.63
4	1	.....	.....	.....	5	8	6	.....	14	13	.....	1	21.94
3	2	3	2	.....	10	5	5	.....	10	10	.....	.....	9.73
173	27	30	13	.....	243	97	86	.....	183	147	28	8	17.20
12	2	.....	.....	.....	14	14	7	.....	21	19	1	1	19.09
2	.....	1	.....	.....	3	8	6	.....	14	13	1	.....	12.25
21	.....	1	.....	.....	22	17	13	.....	30	23	3	4	14.69
1	.....	.....	1	.....	2	4	2	.....	6	6	.....	.....	15.00
14	.....	.....	1	.....	15	20	13	.....	33	30	.....	3	22.04
.....	.....	.....	.....	.....	.....	3	.....	.....	3	3	.....	.....	10.10
5	.....	.....	.....	.....	5	8	6	.....	14	12	2	.....	19.49
5	.....	2	.....	.....	7	2	3	.....	5	5	.....	.....	7.80
418	74	64	45	2	603	463	415	.....	878	731	96	51	17.17

\*Died at County farm, 24.

Table  
Births, Marriages and Deaths for  
Strafford

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Barrington.....	1,208	10	5	..	15	12.42	12	....	..	1	2
Dover.....	13,207	140	163	..	303	22.94	100	137	30	31	5
Durham.....	996	12	9	..	21	21.08	13	4	1	2	1
Farmington.....	2,265	21	14	..	35	15.45	29	1	2	2	1
Lee.....	545	2	4	..	6	11.01	5	1	....	....	..
Madbury.....	336	4	.....	..	4	11.90	3	1	....	....	..
Middleton.....	300	3	2	..	5	16.66	5	....	....	....	..
Milton.....	1,625	22	16	..	38	23.38	28	7	2	1	..
New Durham.....	625	5	6	..	11	17.60	7	1	2	1	..
Rochester.....	8,466	111	119	..	230	27.16	109	68	28	22	3
Rollinsford.....	1,701	30	17	..	47	27.62	12	30	2	3	..
Somersworth.....	7,023	108	107	..	215	30.61	24	175	8	6	2
Strafford.....	1,040	6	2	..	8	7.69	7	...	1	....	..
Total.....	39,337	474	464	..	938	23.84	354	425	76	69	14

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
8					8	5	5		10	8	1	1	8.27
120	34	26	13	3	196	113	137		*250	164	65	21	18.92
5		1			6	6	8		14	12	1	1	14.05
30			2		32	22	26		48	46	1	1	21.19
4		2			6	3	6		9	6	1	2	16.51
							1		1	1			2.97
2					2		3		3	3			10.00
11		2	4	1	18	10	13		23	23			14.15
4		2			6	6	8		14	13		1	22.40
89	8	10	11	1	119	57	64		121	98	11	12	14.29
19	1	1	2		23	17	27		44	26	17	1	25.86
30	29	8	10		77	57	57		114	72	37	5	16.23
10					10	11	10		21	20		1	20.19
332	72	52	42	5	503	307	364		671	491	134	46	17.05

\* Died at county farm, 7. Died at public institutions, 10.

Table  
Births, Marriages, and Deaths for  
Belknap

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Alton .....	1,500	6	4	..	10	6.66	9	....	...	...	1
Barnstead .....	1,072	10	7	..	17	15.85	14	....	....	3	..
Belmont .....	1,294	11	18	..	29	22.41	17	5	3	4	..
Centre Harbor.....	422	2	2	..	4	9.48	1	1	....	1	1
Gilford .....	661	8	3	..	11	16.64	9	1	1	....	..
Gilmanton... ..	1,100	10	6	..	16	14.54	11	....	2	2	1
Laconia .....	8,042	105	90	1	196	24.37	72	74	22	25	3
Meredith.....	1,713	18	11	..	29	16.92	26	....	....	2	1
New Hampton .....	852	6	4	..	10	11.73	7	1	....	1	1
Sanbornton.....	944	8	3	..	11	11.65	6	1	2	2	..
Tilton .....	1,926	17	19	1	37	20.24	20	13	2	2	..
Total.....	19,526	201	167	2	370	18.94	192	96	32	42	8

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
3	.....	.....	2	.....	5	16	15	....	31	28	2	1	20.66
6	1	1	1	.....	9	10	13	....	23	19	1	3	21.45
12	2	1	.....	.....	15	18	7	...	25	24	....	1	19.31
4	.....	.....	1	.....	5	4	2	....	6	6	.....	.....	14.21
1	.....	.....	.....	.....	1	8	4	....	12	11	...	1	18.16
6	.....	2	.....	.....	8	12	9	....	21	20	....	1	19.09
59	13	14	18	2	106	97	98	....	*195	153	33	9	24.24
15	.....	2	1	1	19	15	15	..	30	27	....	3	17.51
6	.....	.....	.....	.....	6	8	5	....	13	13	.....	.....	15.25
3	.....	1	.....	.....	4	5	4	....	9	9	.....	.....	9.42
14	2	2	1	.....	19	22	20	....	42	38	2	2	21.75
129	18	23	24	3	197	215	192	....	407	348	38	21	20.84

\* Died at county farm, 17. Died at public institutions, 10.



Table  
Births, Marriages, and Deaths for  
Carroll

TOWNS.	Population in 1900.	BIRTHS.								
		Sex.					Parentage.			
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.
Albany .....	210	3	.....	..	3	14.28	3	.....	.....	..
Bartlett.....	1,013	12	12	..	24	23.69	14	4	2	4 ..
Brookfield.....	296	1	2	..	3	10.13	3	.....	.....	..
Chatham.....	269	1	2	..	3	11.15	3	.....	.....	..
Conway .....	3,154	36	32	..	68	21.55	54	7	5	2 ..
Eaton .....	365	3	5	..	8	21.91	8	.....	.....	..
Effingham .....	600	4	4	..	8	13.33	8	.....	.....	..
Freedom .....	594	3	5	..	8	13.46	8	.....	.....	..
Hart's Location.....	38	.....	1	..	1	26.31	.....	.....	1	.....
Jackson.....	622	2	3	..	5	8.04	4	.....	.....	1
Madison.....	529	4	2	..	6	11.34	4	.....	.....	2 ..
Moultonborough.....	901	7	3	..	10	11.09	6	.....	2	2 ..
Ossipee .....	1,479	9	11	1	*21	14.26	16	...	1	1 3
Sandwich .....	1,077	7	11	..	18	16.71	14	1	...	2 1
Tamworth .....	1,050	8	9	..	17	16.19	15	.....	2	.....
Tuftonborough.....	663	7	4	..	11	16.59	10	.....	.....	1 ..
Wakefield .....	1,645	16	24	..	40	24.31	32	4	3	1 ..
Wolfeborough .....	2,390	12	18	..	30	12.55	21	2	1	3 3
Total.....	16,895	135	148	1	284	16.80	223	18	17	18 8

\* Born at county farm, 1.

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
.....	.....	.....	.....	.....	.....	1	2	...	3	3	.....	.....	14.28
9	.....	2	1	.....	12	4	6	.....	10	9	1	.....	9.87
4	.....	.....	.....	.....	4	.....	2	.....	2	2	.....	.....	6.75
.....	.....	1	.....	.....	1	.....	1	.....	1	1	.....	.....	3.72
26	1	1	1	.....	29	29	29	.....	58	52	3	3	18.38
7	.....	.....	.....	.....	7	1	1	..	2	2	.....	.....	5.47
9	.....	.....	1	.....	10	6	5	.....	11	11	.....	.....	18.33
11	.....	1	.....	.....	12	2	4	.....	6	4	2	.....	10.10
.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	.....	.....	26.31
3	.....	.....	1	1	5	6	3	...	9	8	1	.....	14.46
4	.....	.....	.....	.....	4	5	1	.....	6	4	.....	2	11.34
1	.....	.....	1	.....	2	7	6	.....	13	12	1	.....	14.42
6	.....	.....	.....	.....	6	17	16	.....	*33	29	1	3	22.31
3	.....	2	.....	.....	5	5	10	.....	15	14	1	.....	13.92
1	.....	.....	.....	.....	1	9	6	.....	15	15	.....	.....	14.28
3	.....	.....	1	.....	4	6	7	.....	13	12	...	1	19.60
15	1	1	4	.....	21	9	9	.....	18	15	1	2	10.94
15	.....	5	1	.....	21	29	24	.....	53	45	6	2	22.17
117	2	13	11	1	144	137	132	.....	269	239	17	13	15.92

\* Died at county farm, 5.

Table  
Births, Marriages, and Deaths for  
Merrimack

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Allenstown.....	1,496	21	15	..	36	24.03	3	29	2	2	..
Andover.....	1,179	11	12	..	23	19.50	20	..	..	1	2
Boscawen.....	1,455	13	17	..	30	20.61	21	2	2	4	1
Bow.....	617	10	8	..	18	29.17	14	2	2	..	..
Bradford.....	805	2	3	..	5	6.21	3	1	..	..	1
Canterbury.....	821	6	5	..	11	13.39	8	1	..	2	..
Chichester.....	598	6	4	..	10	16.72	9	..	1	..	..
Concord.....	19,632	209	204	..	413	21.03	182	134	45	43	9
Danbury.....	654	9	3	..	12	18.34	9	..	1	2	..
Dunbarton.....	551	6	..	..	6	10.89	4	1	..	1	..
Epsom.....	771	8	3	..	11	14.26	9	..	..	2	..
Franklin.....	5,846	76	61	..	137	23.43	59	43	13	19	3
Henniker.....	1,507	17	24	..	41	27.20	34	3	1	3	..
Hill.....	603	5	3	..	8	13.26	6	..	1	..	1
Hooksett.....	1,665	13	12	..	25	15.01	10	10	3	2	..
Hopkinton.....	1,652	5	13	..	18	10.89	13	1	2	2	..
Loudon.....	960	3	9	..	12	12.50	12	..	..	..	..
Newbury.....	424	3	3	..	6	14.15	3	1	1	1	..
New London.....	768	5	8	..	13	16.92	13	..	..	..	..
Northfield.....	1,227	18	9	..	27	22.00	18	3	1	5	..
Pembroke.....	3,183	36	31	..	67	21.04	15	36	8	7	1
Pittsfield.....	2,129	16	20	..	36	16.90	15	17	1	2	1
Salisbury.....	634	3	4	..	7	11.58	7	..	..	..	..
Sutton.....	776	9	3	..	12	15.46	9	..	2	..	1
Warner.....	1,358	5	8	..	13	9.57	12	..	..	1	..
Webster.....	496	3	2	..	5	10.08	5	..	..	..	..
Wilmot.....	653	2	6	..	8	12.25	6	..	1	1	..
Total.....	52,430	520	490	..	1,010	19.26	519	284	87	100	20

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
.....	5	.....	.....	.....	5	16	16	.....	32	25	6	1	21.39
8	.....	.....	.....	.....	8	9	13	.....	22	20	1	1	18.66
6	.....	2	.....	.....	8	33	17	.....	*50	33	12	5	34.36
3	.....	.....	.....	.....	3	7	5	.....	12	9	3	.....	19.44
6	.....	1	.....	.....	7	6	12	.....	18	15	2	1	22.36
5	1	.....	.....	.....	6	5	6	.....	11	9	.....	2	13.39
6	.....	.....	.....	.....	6	4	4	.....	8	8	.....	.....	13.37
113	15	23	21	1	173	209	188	.....	†397	308	67	22	20.22
4	.....	.....	.....	.....	4	5	5	.....	10	8	2	.....	15.29
.....	.....	.....	1	.....	1	3	4	.....	7	7	.....	.....	12.70
8	.....	.....	.....	.....	8	7	11	.....	18	17	1	.....	23.34
38	9	17	6	.....	70	51	35	.....	186	63	17	6	14.71
8	.....	3	.....	.....	11	10	10	.....	20	17	3	.....	13.27
3	.....	1	.....	.....	4	5	6	.....	11	9	2	.....	18.24
2	.....	3	1	.....	6	9	14	.....	23	19	3	1	13.81
14	.....	4	.....	.....	18	9	12	.....	21	19	2	.....	12.71
2	.....	.....	.....	.....	2	6	12	.....	18	17	.....	1	18.74
4	.....	.....	.....	.....	4	8	5	.....	13	10	3	.....	30.66
7	.....	1	.....	.....	8	5	10	.....	15	14	1	.....	19.53
7	2	2	1	.....	12	6	7	.....	13	13	.....	.....	10.59
4	3	2	2	.....	11	30	32	.....	62	41	17	4	19.47
15	.....	4	.....	1	20	19	30	.....	49	44	3	2	23.01
.....	.....	.....	.....	.....	.....	6	6	.....	12	10	2	.....	19.86
6	.....	1	.....	.....	7	9	11	.....	20	15	2	3	25.77
10	.....	2	.....	.....	12	13	15	.....	28	26	2	.....	20.61
2	.....	.....	.....	.....	2	4	2	.....	6	4	1	1	12.09
7	.....	.....	.....	.....	7	8	7	.....	15	14	.....	1	22.97
288	35	66	32	2	423	502	495	.....	997	794	152	51	19.01

\* Died at the county farm, 29.

† Died at public institutions, 132.

‡ Died at public institutions, 5.

Table  
Births, Marriages, and Deaths for  
Hillsborough

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Amherst.....	1,231	11	5	..	16	12.99	11	1	3	1	..
Antrim.....	1,366	13	6	..	19	13.91	9	4	3	..	3
Bedford.....	1,148	5	5	..	10	8.71	4	3	2	1	..
Bennington....	667	2	8	1	11	16.49	6	3	1	1	..
Brookline.....	606	4	4	..	8	13.19	6	2	..	..	..
Deering.....	486	3	2	..	5	10.29	3	2	..	..	..
Francestown....	693	2	7	..	9	12.98	8	..	1	..	..
Goffstown.....	2,528	24	20	..	*44	17.40	28	6	3	4	3
Greenfield.....	605	7	6	..	13	21.48	11	..	..	1	1
Greenville.....	1,608	36	30	..	66	41.04	11	37	5	13	..
Hancock.....	642	7	5	..	12	18.69	7	1	2	2	..
Hillsborough...	2,254	20	14	..	34	15.08	24	3	3	3	1
Hollis.....	910	4	7	..	11	12.08	4	..	4	1	2
Hudson.....	1,261	13	13	..	26	20.61	13	4	4	5	..
Litchfield.....	243	2	3	..	5	20.57	4	..	..	1	..
Lyndeborough...	686	8	5	..	13	18.95	10	..	..	3	..
Manchester.....	56,987	850	857	4	1,711	30.02	327	1,048	146	161	29
Mason.....	358	1	5	..	6	16.75	5	1	..	..	..
Merrimack.....	1,234	4	8	..	12	9.72	8	2	..	1	1
Milford.....	3,739	40	42	..	82	21.93	30	35	8	8	1
Mont Vernon....	453	..	..	1	1	2.21	1	..	..	..	..
Nashua.....	23,898	338	323	..	661	27.65	164	361	61	67	8
New Boston.....	1,002	11	8	..	19	18.96	13	1	1	4	..
New Ipswich....	911	14	12	..	26	28.54	10	11	2	2	1
Pelham.....	875	8	8	..	16	18.28	7	5	1	2	1
Peterborough...	2,527	22	14	..	36	14.24	18	9	3	6	..
Sharon.....	122	..	..	..	..	..	..	..	..	..	..
Temple.....	313	2	2	..	4	12.78	2	1	..	1	..
Weare.....	1,553	14	10	..	24	15.45	17	4	3	..	..
Wilton.....	1,696	16	20	..	36	21.22	20	5	5	6	..
Windsor.....	38	1	1	..	2	52.62	1	1	..	..	..
Total.....	112,640	1,482	1,450	6	2,938	26.08	782	1,550	261	294	51

\* Born at the county farm, 7.

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.						
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.		
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.
1		1			2	7	15		22	19	3	
17			2		19	12	8		20	13	2	5
7	1		2		10	13	11		24	18	5	1
4		3			7	7	4		11	10	1	
2	1		1		4	4	4		8	7	1	
2					2	2	4		6	4		2
						5	4		9	9		
15		2			17	48	37		*85	52	30	3
2					2	5	5		10	9		1
5	4	4	4		17	12	16		28	17	11	
5		2			7	10	6		16	15	1	
18	1	2	3		24	30	29		59	53	3	3
3					3	8	8		16	14	1	1
6	2	1	1		10	12	6		18	15	3	
		1			1	4	2		6	4	1	1
1					1	8	7		15	13	1	1
218	308	97	82	2	707	595	660		†1,255	887	351	11
						8	5		13	13		
3					3	9	10		19	15	4	
19	4	3	5		31	27	43		70	61	8	1
1					1	4			4	2	1	1
155	90	61	40	1	347	247	203		†450	331	111	8
10		1	1		12	4	8		12	8	2	2
8	2	1			11	13	5		18	13	5	
5					5	6	5		11	10	1	
14	6	2	2		24	18	18		36	28	8	
2			1		3	2	1		3	3		
7		2	4		13	16	15		31	29	1	1
4	1	2	4		11	13	14		27	20	6	1
						1			1	1		
534	420	185	152	3	1,294	1,150	1,153		2,303	1,693	567	43
												20.44

‡ Died at public institutions, 190.

† Died at public institutions, 35.

\* Died at county farm, 53.





No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.						
						Sex.				Nativity.		
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.
3					3	11	3		14	13	1	
6	1	1			8	6	6		12	9	3	
2					2	2	2		4	4		
5	2	1			8	17	7		24	15	9	
2					2	2	5		7	6	1	
4	1	1	2		8	5	6		11	10	1	
17	4	2	4		27	18	18		36	27	6	3
8	5	6	4	1	24	16	15		31	21	9	1
71	6	9	9		95	81	84	1	166	133	31	2
6	4	2			12	9	11		20	15	4	1
5					5	4	11		15	12	1	2
1					1	2	3		5	4		1
2					2	4	2		6	6		
6					8	2	4		6	6		
3					3	5	1		6	4	1	1
4					4	2	1		3	3		
9		2	2		13	3	11		14	12	2	
13	6				19	13	8		21	17	4	
15	5	5	2		27	20	21		41	26	13	2
3					3	16	7		*23	21	1	1
14	4	1	4		23	16	13		29	22	6	1
197	38	30	27	1	293	254	240	1	495	387	90	18
												15.80

† Died at public institutions, 24.

\* Died at county farm, 11.

Table  
Births, Marriages and Deaths for  
Sullivan

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Acworth .....	594	3	3	..	6	10.10	5	1	....	....	..
Charlestown .....	1,473	6	6	..	12	8.14	10	1	1	....	..
Claremont .....	6,498	76	79	..	155	23.85	87	38	17	10	3
Cornish .....	962	2	5	..	7	7.27	5	1	1	....	..
Croydon .....	372	.....	1	..	1	2.68	1	....	....	....	..
Goshen .....	345	3	5	..	8	23.18	5	1	2	....	..
Grantham .....	374	3	3	..	6	16.04	5	....	....	....	1
Langdon .....	339	4	5	..	9	26.55	7	1	1	....	..
Lempster .....	391	3	1	..	4	10.23	3	....	1	....	..
Newport .....	3,126	28	36	1	65	20.79	43	14	2	5	1
Plainfield .....	1,114	7	3	..	10	8.97	7	1	....	1	1
Springfield .....	439	3	7	..	10	22.77	7	1	1	1	..
Sunapee .....	946	11	15	..	26	27.48	16	2	5	2	1
Unity .....	572	4	2	..	6	10.48	4	1	....	1	..
Washington .....	464	1	3	..	4	8.62	2	1	....	....	1
Total .....	18,099	154	174	1	329	18 17	207	63	31	20	8

No. 1.—Continued.

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death rate per 1,000.
3	.....	.....	1	.....	4	6	4	....	10	10	.....	.....	16.83
8	.....	1	2	.....	11	9	6	....	15	13	2	...	10.18
74	8	11	12	.....	105	59	56	...	115	85	23	7	17.69
7	.....	.....	.....	.....	7	4	8	....	12	12	.....	.....	16.12
2	.....	.....	.....	.....	2	2	4	....	6	6	.....	.....	16.12
3	.....	.....	.....	.....	3	5	2	....	7	6	1	...	20.28
3	.....	.....	.....	.....	3	1	3	....	4	3	1	....	10.69
.....	.....	.....	.....	.....	.....	2	1	....	3	3	.....	.....	8.85
1	.....	1	.....	.....	2	1	3	....	4	4	.....	.....	10.23
30	12	6	4	.....	52	25	33	....	58	50	5	3	18.55
4	.....	.....	.....	.....	4	8	4	...	12	10	2	....	10.77
3	.....	.....	.....	.....	3	6	3	....	9	7	.....	2	20.50
10	.....	1	.....	.....	11	4	8	....	12	8	3	1	12.68
3	.....	1	.....	.....	4	11	4	....	*15	14	.....	1	26.22
3	.....	.....	.....	.....	3	4	3	....	7	4	2	1	15.08
154	20	21	19	....	214	147	142	....	289	235	39	15	15.95

\* Died at county farm, 6.

Table  
Births, Marriages, and Deaths for  
Grafton

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Alexandria.....	630	5	5	..	10	15.86	8	..	1	..	1
Ashland.....	1,289	16	18	..	34	26.37	17	7	2	6	2
Bath.....	1,006	8	7	..	15	14.91	10	..	3	1	1
Benton.....	209	..	1	..	1	4.78	..	..	1	..	..
Bethlehem.....	1,261	11	16	..	27	21.41	14	6	5	1	1
Bridgewater.....	244	4	2	..	6	24.59	5	1	..	..	..
Bristol.....	1,600	10	19	..	29	18.12	23	2	..	1	3
Campton.....	999	4	1	..	5	5.00	3	..	1	..	1
Canaan.....	1,444	21	11	..	32	22.15	17	2	6	7	..
Dorchester.....	308	2	..	..	2	6.49	1	..	..	1	..
Easton.....	249	1	1	..	2	8.02	..	..	2	..	..
Ellsworth.....	107	..	..	..	..	..	..	..	..	..	..
Enfield.....	1,845	27	23	..	50	27.10	30	10	3	6	1
Franconia.....	655	3	4	..	7	10.68	4	1	1	1	..
Grafton.....	748	5	4	..	9	12.03	7	1	..	..	1
Groton.....	346	3	1	..	4	11.56	3	..	1	..	..
Hanover.....	1,884	22	16	..	38	20.16	21	4	6	5	2
Haverhill.....	3,414	34	33	2	69	20.21	47	6	10	4	2
Hebron.....	214	3	4	..	7	32.71	5	1	1	..	..
Holderness.....	662	6	4	..	10	15.10	7	1	..	1	..
Landaff.....	500	12	11	..	23	46.00	13	6	3	1	..
Lebanon.....	4,965	61	44	..	105	21.14	50	22	15	16	2
Lincoln.....	541	8	8	..	16	29.57	5	5	5	1	..
Lisbon.....	2,221	22	27	..	49	22.06	35	6	3	4	1
Littleton.....	4,066	47	53	..	100	24.59	54	21	13	10	2
Livermore.....	191	1	2	..	3	15.70	..	3	..	..	..
Lyman.....	426	2	7	..	9	21.12	6	..	1	1	1
Lyme.....	1,080	9	11	..	20	18.51	18	..	1	1	..
Monroe.....	545	6	5	..	11	20.18	7	2	2	..	..
Orange.....	213	3	5	..	8	37.55	6	1	..	1	..
Orford.....	890	11	10	..	21	23.59	20	..	..	1	..
Piermont.....	637	4	4	..	8	12.56	8	..	..	..	..
Plymouth.....	1,972	13	31	..	44	22.31	32	3	4	5	..
Rumney.....	837	6	9	..	15	17.92	10	..	2	3	..
Thornton.....	552	1	5	..	6	10.86	4	1	..	1	..
Warren.....	799	6	9	..	15	18.77	7	4	3	1	..
Waterville.....	50	..	..	..	..	..	..	..	..	..	..
Wentworth.....	617	7	6	..	13	21.06	11	..	1	1	..
Woodstock.....	628	9	9	..	18	28.66	14	1	..	2	1
Total.....	40,844	413	426	2	841	20.59	522	117	96	83	23

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
3					3	7	8		15	5		10	23.80
13	2	4	1		20	9	12		21	19		2	16.28
6	1		1		8	3	13		16	14	1	1	15.90
						3			3	3			14.35
9			2		11	11	12		23	15	5	3	18.23
						1	2		3	2		1	12.29
8					8	11	8		19	15		4	11.87
6					6	4	9		13	13			13.01
21		1	1		23	15	10		25	22	1	2	17.31
1					2	1	3		4	3	1		12.98
2					2	6	4		10	8		2	40.15
15	3		2		21	20	18		38	34	1	3	20.59
2		1			3	3	6		9	8		1	13.74
3					3	8	6		14	14			18.71
3					3	2	3		5	5			14.45
12	1	3			16	29	21		50	40	5	5	26.53
34	1	6	6	1	48	41	51		*92	75	6	11	26.94
2			1		3	2			2	2			9.34
3					3	4	10		14	10		4	21.14
4	1				5	7	2		9	7	2		18.00
27	13	6	7		53	39	45		84	68	14	2	17.11
	2	3	2		7	5	3		8	6	2		14.78
15		9	2		26	20	16		36	33	2	1	16.20
30	3	4	7		44	31	49		80	64	12	4	19.67
3					3		2		2	2			4.69
5		1	1		7	8	11		19	19			17.59
3					3	4	4		8	7	1		14.67
		1			1		1		1		1		4.68
8		1			9	9	7		16	14	2		17.97
4					5	3	1		4	4			6.28
18	1	3	1	2	25	12	21		33	29	3	1	16.73
5	1				6	9	8		17	17			20.31
						3	5		8	7		1	14.49
2		1	3		6	15	7		22	21	1		27.52
1					1	7	5		12	11		1	19.44
7	3	2			12	3	6		9	9			14.33
275	32	49	37	3	396	355	389		744	625	60	59	18.21

\* Died at county farm, 14.



Table  
Births, Marriages, and Deaths for  
Coos

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Berlin.....	8,886	236	268	..	504	56.71	46	352	67	36	8
Carroll.....	710	1	2	..	3	4.22	..	2	...	...	1
Clarksville.....	307	4	1	..	5	16.28	2	...	2	1	..
Colebrook ...	1,876	14	17	..	31	16.52	22	4	2	2	1
Columbia.....	690	6	2	..	8	11.58	5	1	1	1	..
Dalton.....	592	4	5	..	9	15.20	5	2	2	..	..
Dummer.....	349	2	2	..	4	11.46	2	1	...	...	1
Errol.....	305										..
Gorham.....	1,797	30	32	..	62	34.50	22	27	8	5	..
Jefferson.....	1,080	13	7	..	20	18.51	13	4	3	..	..
Lancaster.....	3,190	20	25	..	45	14.10	25	3	9	7	1
Milan.....	3,135	14	13	..	27	8.61	17	1	4	5	..
Millsfield.....	41										..
Northumberland.....	1,977	14	22	..	36	18.20	18	7	6	4	1
Pittsburg.....	687	5	2	..	7	10.18	3	2	1	...	1
Randolph.....	137	...	3	..	3	21.89	3	...	...	...	..
Shelburne.....	283	1	1	..	2	7.07	...	1	1	...	..
Stark.....	783	7	6	..	13	17.73	6	2	4	1	..
Stewartstown.....	1,150	18	10	..	*28	24.34	14	2	5	2	5
Stratford.....	968	12	10	1	23	23.76	13	4	3	1	2
Whitefield.....	2,157	22	19	..	41	19.00	17	12	7	2	3
Total.....	†29,468	424	446	1	871	29.55	233	427	125	67	19

\* Born at the county farm, 2.

† Including unincorporated townships and grants.

No. 1.—*Continued.*

the year ending December 31, 1906.

County.

MARRIAGES.						DEATHS.						
Both American.						Sex.				Nativity.		
	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.
44	42	13	32	1	132	88	9*	....	†186	128	47	11
5	....	2	....	....	7	6	5	....	11	8	1	2
2	....	....	....	....	2	6	1	....	7	4	2	1
8	....	1	1	....	10	10	11	....	21	19	2	....
1	....	....	1	....	2	7	6	....	13	9	4	....
3	....	....	1	....	4	2	5	....	7	6	1	....
1	....	....	....	....	1	3	1	....	4	3	....	1
2	1	....	....	....	3	1	2	....	3	3	....	....
31	7	3	10	....	51	22	16	....	38	27	10	1
11	....	1	....	....	12	9	1	....	10	8	1	1
10	1	1	4	....	16	17	21	....	38	28	4	6
3	....	2	3	....	8	5	7	....	12	12	....	....
....	....	....	....	....	....	....	1	....	1	1	....	....
7	4	1	4	....	16	12	4	....	16	9	5	2
8	....	3	1	....	12	3	2	....	5	4	....	1
....	....	....	....	....	....	....	1	....	1	1	....	....
2	....	....	....	....	2	....	1	....	1	1	....	....
4	....	....	2	....	6	7	3	....	10	9	....	1
5	....	1	1	....	7	15	3	....	*18	9	7	2
2	1	....	4	....	7	7	4	....	11	10	1	....
6	2	1	4	....	13	19	13	....	32	29	2	1
155	58	29	68	1	311	239	206	....	445	328	87	30

\* Died at county farm, 2.

† Died at public institutions, 15.

Table  
Births, Marriages, and Deaths for  
Recapitulation

COUNTIES.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Rockingham .....	51,118	516	519	8	1,043	20.40	575	257	90	94	27
Strafford .....	39,337	474	464	..	938	23.84	354	425	76	69	14
Belknap.....	19,526	201	167	2	370	18.94	192	96	32	42	8
Carroll .....	16,895	135	148	1	284	16.80	223	18	17	18	8
Merrimack .....	52,430	520	490	..	1,010	19.26	519	284	87	100	20
Hillsborough .....	112,640	1,482	1,450	6	2,938	26.08	782	1,550	261	294	51
Cheshire.....	31,321	319	290	1	610	19.47	326	159	55	57	13
Sullivan. . . . .	18,099	154	174	1	329	18.17	207	63	31	20	8
Grafton.....	40,844	413	426	2	841	20.59	522	117	96	83	23
Coös.....	29,468	424	446	1	871	29.55	233	427	125	67	19
Total.....	411,588	4,638	4,574	22	9,234	22.43	3,933	3,396	870	844	191

No. 1.—*Concluded.*

the year ending December 31, 1906.

by Counties.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
										American.	Foreign.	Not stated.	Death-rate per 1,000.
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	
418	74	64	45	2	603	463	415	..	878	731	96	51	17.17
332	72	52	42	5	503	307	364	..	671	491	134	46	17.05
129	18	23	24	3	197	215	192	..	407	348	38	21	20.84
117	2	13	11	1	144	137	132	..	269	239	17	13	15.92
288	35	66	32	2	423	502	495	..	997	794	152	51	19.01
534	420	185	152	3	1,294	1,150	1,153	..	2,303	1,693	567	43	20.44
197	38	30	27	1	293	254	240	1	495	387	90	18	15.80
154	20	21	19	....	214	147	142	..	289	235	39	15	15.95
275	32	49	37	3	396	355	389	..	744	625	60	59	18.21
155	58	29	68	1	311	239	206	..	445	328	87	30	15.10
2,599	769	532	457	21	4,378	3,769	3,728	1	7,498	5,871	1,280	347	18.21

Table  
Births by Sex and

COUNTIES.		January.	February.	March.	April.	May.
Rockingham .....	Males.....	36	38	37	48	48
	Females .....	37	38	49	40	48
	Not stated.....	1	2		3	
Strafford.....	Males.....	48	43	44	27	36
	Females .....	35	31	38	49	39
	Not stated.....					
Belknap.....	Males.....	20	11	24	20	21
	Females .....	12	14	21	13	13
	Not stated.....			1		
Carroll.....	Males.....	8	7	14	14	11
	Females .....	6	12	15	10	7
	Not stated.....					
Merrimack.....	Males.....	41	38	48	42	33
	Females .....	26	41	48	40	43
	Not stated.....					
Hillsborough.....	Males.....	81	111	118	114	130
	Females .....	113	132	124	126	116
	Not stated..	1				
Cheshire..	Males.....	31	23	22	27	18
	Females .....	29	25	31	11	12
	Not stated.....					
Sullivan.....	Males.....	8	12	14	17	14
	Females .....	15	13	15	17	19
	Not stated.....					
Grafton.....	Males.....	28	28	25	38	36
	Females .....	35	34	29	33	38
	Not stated.....					
Coös.....	Males.....	27	38	48	31	45
	Females .....	36	44	52	38	34
	Not stated.....					
Total.....	Males.....	328	349	394	378	392
	Females .....	344	384	422	377	369
	Not stated.....	2	2	1	3	
Grand total.....		674	735	817	758	761

No. 2.

Month, by Counties, 1906.

June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
39	48	44	55	48	39	36	.....	516	.....
40	50	57	39	41	41	39	.....	519	.....
.....	.....	.....	.....	2	.....	.....	.....	8	1,043
45	48	32	36	35	38	42	.....	474	.....
40	49	43	38	29	35	38	.....	464	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	938
15	22	17	14	12	10	15	.....	201	.....
15	8	13	13	17	12	16	.....	167	.....
.....	1	.....	.....	.....	.....	.....	.....	2	370
13	9	15	12	8	12	12	.....	135	.....
13	18	17	10	12	16	12	.....	148	.....
.....	.....	.....	.....	1	.....	.....	.....	1	284
42	38	56	55	49	44	34	.....	520	.....
34	46	44	39	41	45	43	.....	490	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	1,010
128	169	134	136	132	111	118	.....	1,482	.....
134	136	115	107	119	110	118	.....	1,450	.....
.....	1	.....	.....	1	.....	3	.....	6	2,938
27	30	31	29	35	17	29	.....	319	.....
31	28	26	30	17	26	24	.....	290	.....
.....	.....	.....	.....	1	.....	.....	.....	1	610
8	13	14	11	14	13	16	.....	154	.....
10	16	13	15	9	17	15	.....	174	.....
.....	.....	.....	1	.....	.....	.....	.....	1	329
39	32	50	36	34	31	36	.....	413	.....
39	46	36	36	36	31	33	.....	426	.....
.....	.....	1	1	.....	.....	.....	.....	2	841
26	31	38	38	36	27	39	.....	424	.....
46	43	31	30	32	36	24	.....	446	.....
.....	.....	1	.....	.....	.....	.....	.....	1	871
382	440	431	422	403	342	377	.....	4,638	.....
402	440	395	357	353	369	362	.....	4,574	.....
.....	2	2	2	4	1	3	.....	22	.....
784	882	828	781	760	712	742	.....	9,234	9,234



Table  
Births showing age of mother,

NUMBER OF CHILD.	Under 15.			15 to 20.			20 to 25.			25 to 30.			30 to 35.		
	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.
1st.....	3	....	....	466	135	8	657	429	5	341	274	....	152	106	....
2d.....	....	....	....	100	39	2	418	291	...	315	249	2	147	91	1
3d.....	....	....	....	17	7	1	199	133	3	228	205	1	158	94	2
4th.....	....	....	....	4	....	....	83	77	1	178	188	....	113	123	2
5th.....	....	....	....	....	....	....	23	21	....	105	134	....	86	135	1
6th.....	....	....	....	....	....	....	7	4	....	54	63	....	81	129	....
7th.....	....	....	....	....	....	....	2	4	....	23	44	....	67	97	....
8th.....	....	....	....	....	....	....	....	....	....	6	20	....	24	75	....
9th.....	....	....	....	....	....	....	....	1	....	2	8	....	17	49	....
10th.....	....	....	....	....	....	....	....	....	....	1	....	....	11	25	....
11th.....	....	....	....	....	....	....	....	....	....	....	2	....	6	16	....
12th.....	....	....	....	....	....	....	....	....	....	....	1	....	2	4	....
13th.....	....	....	....	....	....	....	....	....	....	....	....	....	2	3	....
14th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....
15th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
16th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
17th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
18th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
19th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
20th.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Not stated	....	....	....	3	2	....	6	3	....	8	3	....	11	6	....
Total....	3	....	....	590	183	11	1,395	963	9	1,261	1,191	3	877	956	6

## No. 3.

## Number of Child, by Nationality, 1906.

35 to 40.			40 to 45.			45 to 50.			Not stated.			Total.			Grand total.
American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	
44	25	...	3	6	...	1	...	15	7	...	1,681	983	13	2,677	
72	36	...	13	9	...	...	...	21	8	2	1,086	723	7	1,816	
73	36	1	17	9	...	1	...	13	3	2	706	487	10	1,203	
80	48	...	21	12	1	2	1	13	6	...	494	455	4	953	
48	72	...	16	12	...	...	...	5	3	...	283	377	1	661	
59	86	3	14	24	...	1	1	3	6	...	219	313	3	535	
49	63	1	14	19	...	2	2	2	8	1	159	237	2	398	
40	66	2	23	24	...	1	3	2	1	...	96	189	2	287	
19	70	...	16	17	...	2	...	2	3	1	56	150	1	207	
19	42	...	7	28	...	2	...	...	1	...	38	98	...	136	
9	40	...	11	19	...	1	2	...	1	...	27	80	...	107	
8	25	...	5	22	...	1	1	...	...	...	16	53	...	69	
5	11	...	3	18	...	...	...	...	2	...	10	34	...	44	
2	19	...	2	9	...	1	...	...	...	...	4	32	...	36	
3	2	...	...	11	...	2	...	...	...	...	3	15	...	18	
...	...	...	...	3	...	3	...	...	...	...	2	6	...	8	
...	...	...	1	1	...	1	...	...	...	...	1	2	...	3	
...	1	...	...	1	...	...	...	...	...	...	...	2	...	2	
...	...	...	...	1	...	...	...	...	...	...	...	1	...	1	
...	...	...	...	1	...	1	...	...	...	...	...	2	...	2	
4	5	...	2	1	...	...	...	6	7	4	40	27	4	71	
536	647	7	168	247	1	9	23	82	56	10	4,921	4,266	47	9,234	

Table No. 4.—1906.

AGES OF GROOMS.	AGES OF BRIDES.														No. of grooms.
	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	70 to 75.	75 to 80.	Over 80. Not stated.	
Under 20.....	*155	52	3	..	1	..	1	..	..	..	..	..	..	..	211
20 to 25.....	†672	828	143	21	6	..	1	..	..	..	..	..	..	..	1,671
25 to 30.....	‡230	474	298	72	20	4	1	..	..	..	..	..	..	1	1,100
30 to 35.....	§52	165	176	125	25	10	4	..	..	..	1	..	..	..	558
35 to 40.....	18	55	74	63	53	16	6	2	..	..	..	..	..	..	287
40 to 45.....	5	19	36	38	41	22	12	3	1	..	..	..	..	1	178
45 to 50.....	5	9	13	34	22	23	21	3	2	..	..	..	..	..	132
50 to 55.....	1	6	5	13	18	26	17	12	4	1	..	..	..	..	103
55 to 60.....	1	1	5	1	9	9	11	12	9	2	..	..	..	..	60
60 to 65.....	1	1	1	3	3	6	4	5	5	3	3	..	..	..	35
65 to 70.....	..	..	..	..	1	1	3	4	4	2	5	1	1	..	22
70 to 75.....	..	..	..	1	1	..	2	1	..	2	3	..	..	..	10
75 to 80.....	..	..	..	..	2	..	1	..	2	..	..	..	..	..	5
Over 80.....	..	..	..	..	..	..	..	..	2	..	..	..	..	..	2
Not stated.....	..	..	..	..	..	..	..	..	..	..	..	..	4	..	4
No. of brides.....	1,140	1,610	754	371	202	117	83	42	29	10	12	1	1	6	4,378

\* Two brides 15.

† Ten brides 15; one bride 14; one bride 13.

‡ Five brides 15.

§ One bride 15.

Table No. 5.  
Still Births, by Sex, Parentage, and Months, by Counties, 1906.

COUNTIES.	SEX.		PARENTAGE.					MONTHS.												BIRTHS.	
	Male.	Female.	Not stated.	Both American.	Both foreign.	American mother and foreign father.	American mother and foreign mother.	Not stated.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Not stated.
Rockingham.....	23	30	3	30	4	7	10	5	56	3	3	9	7	1	3	4	7	3	3	6	...
Strafford.....	19	18	1	17	12	3	3	4	38	1	1	3	2	5	...	4	5	1	2	5	...
Belknap.....	7	6	3	6	7	...	2	3	2	1	2	1	1	1	...	1	1	1	1	2	...
Carroll.....	7	7	1	11	11	...	2	1	15	1	1	1	1	3	...	1	3	1	2	...	...
Merrimack.....	35	20	...	15	15	9	6	3	55	3	6	4	...	2	6	2	4	3	9	6	...
Hillsborough.....	109	57	9	37	96	13	15	14	175	9	18	19	17	12	14	10	15	22	7	17	...
Cheshire.....	19	11	...	18	2	2	7	1	30	2	1	2	1	1	4	1	2	4	7	3	...
Sullivan.....	7	8	...	5	6	2	1	1	15	...	1	3	1	...	...	1	2	3	1	3	...
Grafton.....	25	18	...	25	7	3	5	3	43	...	2	3	6	...	4	1	3	1	4	4	...
Cooks.....	15	15	1	13	10	6	1	1	31	2	2	...	3	3	...	4	4	3	3	3	...
Total.....	266	190	18	184	160	44	51	34	474	40	26	47	43	32	32	29	46	43	39	49	...

## Divorces.

Table No. 6.

Divorces Decreed by the Supreme Court of New Hampshire, in the year 1906, as returned by the Clerks of the Several Counties.

COUNTIES.	CAUSES OF DIVORCE.														LIBELLANTS.		Total of each county.			
	Conviction of crime and imprisonment.	Abandonment.	Abandonment and adultery.	Absent three years and habitual drunkenness.	Adultery.	Desertion.	Extreme cruelty.	Extreme cruelty and willing absence.	Extreme cruelty and habitual drunkenness.	Treatment injurious to health and adultery.	Habitual drunkenness.	Impotency.	Willing absence and refusal to cohabit.	Treatment injurious to health.	Nullity.	Treatment injurious to health and to reason.		Willing absence three years.	Males.	Females.
Rockingham.....	1	19	.....	.....	7	.....	9	.....	.....	6	.....	.....	.....	3	1	1	2	12	37	49
Strafford.....	.....	15	.....	.....	2	3	4	.....	.....	3	.....	.....	.....	4	.....	1	4	10	27	37
Belknap.....	.....	16	.....	.....	7	.....	11	.....	.....	6	.....	.....	.....	2	.....	1	1	12	31	43
Carroll.....	.....	2	.....	.....	5	.....	4	.....	.....	.....	.....	.....	3	2	1	.....	2	9	10	19
Merrimack.....	.....	1	.....	.....	18	1	4	.....	.....	2	.....	.....	6	2	.....	.....	5	10	34	44
Hillsborough.....	2	44	.....	2	16	.....	36	1	.....	9	1	.....	.....	5	.....	1	12	45	84	129
Cheshire.....	.....	10	.....	.....	4	.....	8	.....	.....	2	.....	.....	1	1	.....	.....	2	7	21	28
Sullivan.....	.....	4	.....	.....	9	.....	7	1	.....	1	.....	.....	6	3	.....	.....	.....	12	20	32
Grafton.....	1	27	.....	.....	11	1	14	.....	.....	4	.....	.....	7	3	.....	1	1	21	42	63
Cook's.....	.....	5	.....	.....	9	.....	6	.....	.....	1	.....	.....	.....	2	1	.....	.....	16	15	31
Total.....	5	147	.....	2	88	5	103	2	3	34	1	22	27	3	4	29	154	321	475	

## CAUSES OF DEATH.

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### INTERNATIONAL CLASSIFICATION.

In the following tables the causes of death are arranged according to the Bertillon classification, or what is otherwise known as the International Classification of the Causes of Death.

The old system, heretofore in use in this state in all the Registration reports, and which was known as Dr. Farr's Classification, has been abandoned for one more in accordance with scientific nomenclature.

The International Classification has been adopted by all the Americas and a greater part of Europe. The United States Bureau of the Census used it in its last statistical compilation of the causes of death, and it has been accepted by practically all of the registration states of the country.



Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Atkinson.....	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Auburn.....	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1				
Brentwood.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	.	.	.				
Candia.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Chester.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Danville.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.				
Deerfield.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Derry.....	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.				
East Kingston.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Epping.....	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.				
Exeter.....	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	2	.	.	.	.	5	.	1	.				
Fremont.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Greenland.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Hampstead.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Hampton.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	3	.	.				
Hampton Falls.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Kensington.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.				
Kingston.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.				
Londonderry.....	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.				
Newcastle.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Newfields.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Newington.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Newmarket.....	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.				
Newton.....	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	2	.				
North Hampton.....	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Northwood.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Nottingham.....	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.				
Plaistow.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Portsmouth.....	3	.	.	.	1	1	1	1	.	.	.	.	.	.	.	2	.	.	.	.	.	15	3	.	.				
Raymond.....	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Rye.....	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Salem.....	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	1	.				
Sandown.....	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Seabrook.....	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.				
South Hampton.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Stratham.....	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.				
Windham.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
Total.....	12	.	.	.	1	4	4	4	7	.	.	.	.	.	.	5	.	.	.	.	1	72	4	5	.				

### Counties, 1906.—International Classification.

## I. GENERAL DISEASES.—Continued.

[illegible]

Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Atkinson.....	.	.	.	.	1	2	.	.	.	.	.	1	.	.	.	.	.	.
Auburn.....	.	.	.	.	1	2	.	3	.	.	.	.	.	.	.	.	.	.
Brentwood.....	.	.	.	.	1	3	.	.	5	.	.	.	.	.	.	.	.	.
Candia.....	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Chester.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Danville.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Deerfield.....	3	.	.	.	1	1	1	1	1	1	.	.	.	.	.	1	.	.
Derry.....	1	.	.	.	1	1	1	2	.	.	1	.	1	.	.	.	.	.
East Kingston.....	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Epping.....	1	1	.	.	4	.	.	.	.	.	.	3	.	.	.	.	.	.
Exeter.....	.	.	.	.	11	1	1	1	1	.	.	3	.	.	.	.	.	.
Fremont.....	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.
Greenland.....	.	.	.	.	1	.	.	1	1	.	.	1	.	.	1	.	.	.
Hampstead.....	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Hampton.....	2	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.
Hampton Falls.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Kensington.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Kingston.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Londonderry.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Newcastle.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Newfields.....	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Newington.....	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Newmarket.....	1	.	.	.	.	.	3	.	.	.	.	1	.	.	.	.	.	.
Newton.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
North Hampton.....	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Northwood.....	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.
Nottingham.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Plaistow.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Portsmouth.....	4	.	.	.	11	1	1	.	1	.	1	3	.	.	.	.	.	.
Raymond.....	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Rye.....	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.
Salem.....	1	.	.	.	4	.	2	.	.	.	.	.	.	.	.	.	.	.
Sandown.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seabrook.....	2	2	.	.	.	.	4	.	.	.	.	1	.	.	.	.	.	.
South Hampton.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Stratham.....	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Windham.....	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Total.....	3	14	3	2	3	65	6	19	3	7	1	2	14	.	.	2	.	.

No. 7.—Continued.

## Counties, 1906.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
77. Pericarditis. 78. Acute endocarditis. 79. Organic diseases of the heart. 80. Angina pectoris. 81. Diseases of the arteries. 82. Embolism and thrombosis. 83. Diseases of the veins. 84. Diseases of the lymphatic system. 85. Hemorrhages. 86. Other diseases of the circulatory system.											87. Laryngitis. 88. Other diseases of the larynx. 89. Diseases of the thyroid body. 90. Acute bronchitis. 91. Chronic bronchitis. 92. Broncho-pneumonia. 93. Pneumonia. 94. Pleurisy. 95. Congestion and apoplexy of the lungs. 96. Gangrene of the lungs. 97. Asthma. 98. Pulmonary emphysema. 99. Other diseases of the respiratory system.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Table

Causes of Deaths arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.												
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.
Atkinson.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Auburn.....	.	.	.	.	.	.	.	.	.	.	.	.	1
Brentwood.....	.	.	.	.	.	.	.	.	.	.	.	.	1
Candia.....	.	.	.	.	2	.	1	.	.	.	.	.	.
Chester.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Danville.....	.	.	.	.	.	.	.	1	.	.	.	.	.
Deerfield.....	.	.	.	3	.	.	.	.	.	.	.	.	.
Derry.....	.	.	.	2	5	.	.	1	.	.	.	.	.
East Kingston.....	.	.	.	1	.	.	.	.	1	.	.	.	.
Epping.....	.	.	.	.	3	.	.	.	.	.	.	.	.
Exeter.....	.	.	.	.	3	.	.	.	.	.	.	.	1
Fremont.....	.	.	.	.	2	.	.	.	.	.	.	.	1
Greenland.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Hampstead.....	.	.	.	.	.	1	.	.	.	.	.	.	.
Hampton.....	.	.	.	.	.	1	.	.	.	.	.	.	.
Hampton Falls.....	.	.	.	.	.	.	.	.	.	.	.	.	1
Kensington.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Kingston.....	.	.	.	1	1	.	.	.	.	.	.	.	1
Londonderry.....	.	.	.	2	1	.	.	.	.	.	.	.	.
Newcastle.....	.	.	1	.	.	.	.	.	.	.	.	.	.
Newfields.....	.	.	.	.	1	.	.	.	.	.	.	.	1
Newington.....	.	.	.	.	1	.	.	.	.	.	.	.	.
Newmarket.....	.	.	.	1	4	.	.	.	.	.	.	.	.
Newton.....	.	.	.	.	.	.	.	.	.	.	.	1	.
North Hampton.....	.	.	.	.	.	1	.	.	.	.	.	1	.
Northwood.....	1	.	.	1	.	.	.	.	.	.	.	.	.
Nottingham.....	.	.	.	1	.	.	.	.	.	.	.	.	.
Plaistow.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Portsmouth.....	.	.	.	3	3	1	.	1	1	.	.	2	1
Raymond.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Rye.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Salem.....	.	.	.	1	2	.	.	.	.	.	.	.	.
Sandown.....	.	.	.	1	.	.	.	.	.	.	.	.	.
Seabrook.....	.	.	.	.	1	.	.	1	.	.	.	.	.
South Hampton.....	.	.	.	.	.	.	.	1	.	.	.	.	.
Stratham.....	.	.	.	.	.	.	.	.	1	.	.	.	.
Windham.....	.	.	.	.	.	.	.	.	.	.	.	.	.
Total.....	1	1	19	27	4	4	5	1	1	6	1	1	7





Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.			
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	X. Malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Atkinson.....													
Auburn.....													
Brentwood.....											1		
Candia.....											1		
Chester.....													
Danville.....													
Deerfield.....													
Derry.....									1	3			
East Kingston.....													
Epping.....									1	1			
Exeter.....	1								1	4			3
Fremont.....													
Greenland.....											1		
Hampstead.....													
Hampton.....									2				
Hampton Falls.....											1		
Kensington.....											1		
Kingston.....													
Londonderry.....													
Newcastle.....													
Newfields.....													
Newington.....				1									
Newmarket.....	1								1	1			
Newton.....													
North Hampton.....									1				
Northwood.....													
Nottingham.....													
Plaistow.....													1
Portsmouth.....	2								2	6			1
Raymond.....													
Rye.....	1								1				
Salem.....	1												
Sandown.....													
Seabrook.....	1										2		
South Hampton.....													
Stratham.....													
Windham.....													
Total.....	7			1					10	22			5



Table

Causes of Death arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	I. GENERAL DISEASES.																							
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.
Barrington.....																					3			
Dover.....	5	1			2			1		1	2					2					1	21	3	1
Durham.....																					3			
Farmington.....	1			2				2				1										4		
Lee.....																								
Madbury.....																								
Middleton.....																					2			
Milton.....																					1	1		
New Durham.....																					2			
Rochester.....	1							1			1	1	1		2						5			
Rollinsford.....	1							3													4			
Somersworth.....	2				3							1									6	1	1	
Strafford.....																					5			
Total.....	9	2		2	5			7		1	5	1		1	4						156	5	2	



Table  
Causes of Death by Towns and

TOWNS IN STRAFFORD COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Barrington.....	9																	
Dover.....	1			1	12		4	1	1			2					5	
Durham.....							1											
Farmington.....	1					2	1											
Lee.....														1				
Madbury.....																		
Middleton.....																		
Milton.....						2												
New Durham.....						2		1										
Rochester.....	10					5											3	
Rollinsford.....	1					4		1					1				2	
Somersworth.....	1			2	5	1	1											
Strafford.....						2		1									1	
Total.....	2	21		3	34	2	9	1	1			2	1	1		11		

No. 7.—Continued.

## Counties, 1906.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.													
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.	
...	...	32	...	1	3	...	...	...	...	...	...	...	1	2	1	17	2	...	1	...	1	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	6	2	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	1	...
...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	4	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	3	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
1	...	7	...	...	...	...	...	...	...	...	...	...	3	1	5	...	...	...	3	...	...	1	...
...	1	3	...	...	...	...	...	...	...	...	...	...	1	...	3	...	...	...	...	...	...	...	...
...	...	4	...	...	...	...	...	...	...	...	...	...	6	2	1	6	...	1	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...
1	1	65	3	3	3	...	...	...	...	...	...	...	14	3	5	39	...	6	...	1	...	...	4



Table

Causes of Deaths arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Barrington.....						1													
Dover.....					3	16	2								2				
Durham.....																			
Farmington.....						4					1			1	1				
Lee.....						1													
Madbury.....																			
Middleton.....																			
Milton.....						1	1	1											
New Durham.....															1				1
Rochester.....				2	11			1					1						
Rollinsford.....				1	3			2											
Somersworth.....				1	16	2		1					1	1	1	1			
Strafford.....														1					
Total.....					7	53	5	5		1		2	1	6	1	1	1		1

## No. 7.—Continued.

## Counties, 1906.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.												VII. THE PUERPERAL STATE.											
119. Acute nephritis.	120. Bright's disease.	121. Other diseases of the kid- neys.	122. Calculi of the urinary tract.	123. Diseases of the bladder.	124. Diseases of the urethra.	125. Diseases of the prostate.	126. Non-venereal diseases of the male genital organs.	127. Metritis.	128. Uterine hemorrhage (non- puerperal.	129. Uterine tumor.	130. Other diseases of the uterus.	131. Cysts and other tumors of the ovary.	132. Other diseases of the fe- male genital organs.	133. Non-puerperal diseases of the breast.	134. Accidents of pregnancy.	135. Puerperal hemorrhage.	136. Other accidents of labor.	137. Puerperal septicemia.	138. Puerperal albuminuria and convulsions.	139. Phlegmasia alba dolens (puerperal).	140. Other puerperal accidents.	141. Puerperal diseases of the breast.	
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	21	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	9	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	
...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	
2	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
5	53	3	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	3	...	

Table

Causes of Deaths arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Barrington.....												
Dover.....					1				1	6		2
Durham.....												
Farmington.....				1						1		
Lee.....												
Madbury.....												
Middleton.....												
Milton.....										1		
New Durham.....										1		
Rochester.....									4	6		1
Rollinsford.....										1		
Somersworth.....									1	9		3
Strafford.....	1											
Total.....	1			1	1				6	25		6

No. 7.—Continued.

Counties, 1906.—International Classification.

	XII. OLD AGE.										XIII. EXTERNAL CAUSES.										XIV. ILL-DEFINED DISEASES.	
	154. Senile debility.																					
	155. Suicide by poison.										156. Suicide by asphyxia.										157. Suicide by hanging or strangulation.	
	158. Suicide by drowning.										159. Suicide by firearms.										160. Suicide by cutting instruments.	
	161. Suicide by jumping from high places.										162. Suicide by crushing.										163. Other suicides.	
	164. Fractures.										165. Dislocations.										166. Other accidental traumas.	
	167. Burns and scalds.										168. Burns from corrosive substances.										169. Sunstroke.	
	170. Freezing.										171. Electric shock.										172. Accidental drowning.	
	173. Inanition (starvation).										174. Absorption of deleterious gases (non-suicidal).										175. Other acute poisonings.	
	176. Other external violence.										177. Dropsy.										178. Sudden death.	
	179. Causes of death unspecified or ill-defined.																					
2																						
20	1		1										2	1								2
5													2									
3																						3
1																						
2																						1
4												2	6						1	4		4
1																		1		2		
3													1	3						1	1	4
2																						
43	1		1							4	11	4			2	6		1	1	5	3	14

Table

Causes of Death arranged by Towns and

TOWNS IN BELKNAP COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicæmia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Alton .....																						3							
Barnstead .....												2																	
Belmont .....						1		1				1				1						3							
Centre Harbor.....																													
Gilford.....																													
Gilmanton.....																						2		1					
Laconia .....	1					3					1	3									19	2	1						
Meredith.. ..																						1							
New Hampton .....																							2						
Sanbornton.....							1																						
Tilton .....						1																							
Total.....	1					5	1	1			1	6				1						30	2	2					

## No. 7.—Continued.

### Counties, 1906.—International Classification.

## I. GENERAL DISEASES.—Continued.

[illegible]



Table

Causes of Death arranged by Towns and

TOWNS IN BELKNAP COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Alton .....						5											1	
Barnstead.....		1						3										
Belmont .....																		
Centre Harbor.....																		
Gilford.....					4													
Gilmanton.....					3	1												
Laconia .....	1	2			6	12			1			5						
Meredith.....		2			1					1								
New Hampton .....		1																
Sanbornton.....					2	2												
Tilton.....		2			3	1	1					1						
Total.....	1	8			24	19	1		2		2	6				1		

No. 7.—Continued.

Counties, 1906.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	3	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...
...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	3	1	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...
1	...	8	3	2	3	...	...	1	...	1	...	...	6	...	1	15	...	1	...	...	1	...
...	...	3	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
...	...	5	...	...	3	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	...	1
1	...	33	5	3	6	...	...	1	...	1	...	...	8	3	1	24	...	2	...	...	1	1

Table

Causes of Deaths arranged by Towns and

TOWNS IN BELKNAP COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Alton.....					2		1												
Barnstead.....														1					
Belmont.....					1				2										
Centre Harbor...							1												
Gilford.....						1													
Gilmanton.....			1																
Laconia.....		1		8	8				2								4		2
Meredith.....							3						1	1					
New Hampton.....			1																
Sanbornton.....																			
Tilton.....						1													1
Total.....		1	2	11	10	5		4					2	1			4		3



Table

Causes of Deaths arranged by Towns and

TOWNS IN BELKNAP COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Alton.....									1	2		
Barnstead.....										1		
Belmont.....										1		
Centre Harbor.....										1		
Gilford..												
Gilmanton.....										3		
Laconia.....			1			1			1	5		
Meredith.....									1	2		
New Hampton..										1		
Sanbornton.....												
Tilton.....												
Total.....			1			1			3	16		

No. 7.—Continued.

Counties, 1906.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																							XIV. ILL-DEFINED DISEASES.	
154. Senile debility.	155. Suicide by poison.	156. Suicide by asphyxia.	157. Suicide by hanging or strangulation.	158. Suicide by drowning.	159. Suicide by firearms.	160. Suicide by cutting instruments.	161. Suicide by jumping from high places.	162. Suicide by crushing.	163. Other suicides.	164. Fractures.	165. Dislocations.	166. Other accidental traumas.	167. Burns and scalds.	168. Burns from corrosive substances.	169. Sunstroke.	170. Freezing.	171. Electric shock.	172. Accidental drowning.	173. Inanition (starvation).	174. Absorption of deleterious gases (non-suicidal).	175. Other acute poisonings.	176. Other external violence.	177. Dropsy.	178. Sudden death.	179. Causes of death unspecified or ill-defined.	
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	
4	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..	..	
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
19	..	1	..	1	..	..	..	..	1	..	3	..	..	..	..	..	..	5	..	..	2	2	2	..	2	
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	
48	1	..	1	..	1	..	..	..	1	..	4	..	..	..	..	1	6	..	..	..	2	2	3	..	10	



Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	I. GENERAL DISEASES.																											
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	12. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.				
Albany .....																												
Bartlett.....																												
Brookfield.....																												
Chatham.....																												
Conway.....	3																					5						
Eaton.....																												
Effingham.....																						1						
Freedom.....																												
Hart's Location.....																												
Jackson.....																						1						
Madison.....																						1						
Moultonborough.....																						1						
Ossipee.....																						1						
Sandwich.....																						2						
Tamworth.....																						1						
Tuftonborough.....																						1	1					
Wakefield.....	2					1																						
Wolfeboro.....							1															1						
Total.....	3	2				1	1															15	1					

No. 7.—*Continued.*

Counties, 1906.—International Classification.

I. GENERAL DISEASES.—*Continued.*

30. Pott's disease.	31. Cold abscess, abscess by congestion.	32. White swelling.	33. Tuberculosis of other organs.	34. General tuberculosis.	35. Scrofula.	36. Syphilis.	37. Gonorrhea (five years and over).	38. Gonorrhea (under five years).	39. Cancer and other malignant tumors of the buccal cavity.	40. Cancer of stomach and liver.	41. Cancer of intestines.	42. Cancer of genital organs.	43. Cancer of breast.	44. Cancer of skin.	45. Cancer of other or unspecified organs.	46. Tumors.	47. Acute articular rheumatism.	48. Chronic rheumatism and gout.	49. Scurvy.	50. Diabetes.	51. Exophthalmic goiter.	52. Addison's disease.	53. Leukemia.	54. Anemia, chlorosis.	55. Other general diseases.	56. Acute and chronic alcoholism.	57. Chronic lead poisoning.	59. Other chronic poisonings.
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	4	..	..	..	..	1	..	..	..	..	..	1	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..
..	..	..	..	..	..	..	..	..	..	3	2	..	1	..	1	..	..	..	..	..	..	..	..	1	..	1	..	..
..	..	..	..	..	..	..	..	..	..	6	3	..	1	..	5	1	1	..	..	2	..	..	..	3	..	2	..	..

Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Albany .....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Bartlett.....	..	1	..	..	..	2	..	..	..	..	..	..	1	..	..	..	..	..
Brookfield.....	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..
Chatham.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Conway .....	..	2	..	1	1	..	1	..	2	..	..	..	..	..	..	..	..	..
Eaton.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Effingham .....	..	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Freedom.....	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Hart's Location.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Jackson.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Madison.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Moultonborough.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Ossipee.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Sandwich.....	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Tamworth.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Tuftonborough.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Wakefield .....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	1	..	..
Wolfeboro .....	..	1	..	..	..	1	1	1	1	1	1	..	..	..	..	1	..	..
Total.....	..	6	..	1	1	19	2	2	3	1	1	1	2	..	2	..	..	..



Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhœa and enteritis. (under two years).	106. Diarrhœa and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Albany.....						1													
Bartlett.....						1													
Brookfield.....																			
Chatham.....																			
Conway.....						1	2										1		
Eaton.....																			
Effingham.....					1														
Freedom.....																			
Hart's Location...																			
Jackson.....					1														
Madison.....										2									
Moultonborough...	1					1													
Ossipee.....					1		1	1											1
Sandwich.....					2	1													
Tamworth.....					1														
Tuftonborough...							1								1				
Wakefield.....					1	1		1											
Wolfeboro.....	1					1	1	1											
Total.....	2				7	7	5	3	2						1	1		1	1

No. 7.—Continued.

## Counties, 1906.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.												VII. THE PUERPERAL STATE.											
119. Acute nephritis.	120. Bright's disease.	121. Other diseases of the kid- neys.	122. Calculi of the urinary tract.	123. Diseases of the bladder.	124. Diseases of the urethra.	125. Diseases of the prostate.	126. Non-venereal diseases of the male genital organs.	127. Metritis.	128. Uterine hemorrhage (non- puerperal).	129. Uterine tumor.	130. Other diseases of the uterus.	131. Cysts and other tumors of the ovary.	132. Other diseases of the fe- male genital organs.	133. Non-puerperal diseases of the breast.	134. Accidents of pregnancy.	135. Puerperal hemorrhage.	136. Other accidents of labor.	137. Puerperal septicemia.	138. Puerperal albuminuria and convulsions.	139. Phlegmasia alba dolens (puerperal).	140. Other puerperal accidents.	141. Puerperal diseases of the breast.	
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
1	7	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	
..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	
1	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
3	28	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	



Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Albany.....												
Bartlett.....												
Brookfield.....												
Chatham.....												
Conway.....									1	1		
Eaton.....										1		
Effingham.....												
Freedom.....												
Hart's Location.....												
Jackson.....												
Madison.....												
Moultonborough.....										2		
Ossipee.....												2
Sandwich.....												
Tamworth.....												
Tuftonborough.....												
Wakefield.....									1			
Wolfeboro.....	1								1			
Total.....	1								3	4		2



Table

Causes of Death arranged by Towns and

TOWNS IN MERRIMACK COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4 Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	23. Tubercular meningitis.	29. Abdominal tuberculosis.					
Allenstown.....											1																		
Andover.....						1				1							1												
Boscawen.....	1									2			2									1							
Bow.....																													
Bradford.....																									1				
Canterbury.....																													
Chichester.....																													
Concord.....	3	1		1		4	1	1	4			2		2		5						26	1	2					
Danbury.....																													
Dunbarton.....									1																				
Epsom.....																													
Franklin.....						1	2	1	2							1													
Henniker.....																													
Hill.....																													
Hooksett.....							1															4							
Hopkinton.....	1																												
Loudon.....																													
Newbury.....													1																
New London.....																													
Northfield.....					3		1																						
Pembroke.....	1					1			1													5							
Pittsfield.....												1										1							
Salisbury.....																													
Sutton.....							1		1							2							2						
Warner.....																							3						
Webster.....																													
Wilmot.....																2													
Total.....	5	1		1	3	7	6	2	12		3	6		2		11					60	1	5						



Table

Causes of Death arranged by Towns and

TOWNS IN MERRIMACK COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																		
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.	
Allenstown.....	2																		
Andover.....						3	1												
Boscawen.....	1					12		1											
Bow.....									1										
Bradford.....						2			1										
Canterbury.....	1			1		2													
Chichester.....						1		2											
Concord.....	7			1	1	21		15	1	10	2		2	1		12			
Danbury.....																1			
Dunbarton.....	1					1													
Epsom.....						1		2											
Franklin.....	2					3		2					1						
Henniker.....						2										1			
Hill.....								1					1						
Hooksett.....						1													
Hopkinton.....	1							3			1		1						
Loudon.....						6							1			1			
Newbury.....						1													
New London.....						4							1						
Northfield.....																			
Pembroke.....	4					1													
Pittsfield.....	1	1				9		2								1			
Salisbury.....						1													
Sutton.....						2						1							
Warner.....						1		4											
Webster.....																			
Wilmot.....																			
Total.....	1	20		2	1	75	1	32	3	10	3	1	6	1		16			

No. 7.—Continued.

Counties, 1906.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	1	1	1	1	1	1	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	
2	54	5	4	2	2	1	1	1	1	1	1	1	4	1	5	22	6	6	3	3	1	1	
2	2	2	1	1	1	1	1	1	2	1	1	1	2	2	2	2	1	1	1	1	1	1	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1	5	6	1	1	1	1	1	1	1	1	1	1	1	1	3	5	1	1	1	1	1	1	
1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	1	1	
1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	
6	2	106	8	5	5	6	6	1	2	1	2	1	16	8	16	68	2	9	2	4	1	1	







Table

## Causes of Death arranged by Towns and

TOWNS IN MERRIMACK COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Allenstown.....									2	2		
Andover.....			1									
Boscawen.....												
Bow.....				1								1
Bradford.....	2											
Canterbury.....												
Chichester.....												
Concord.....	3								3	10	2	6
Danbury.....										1		
Dunbarton.....												
Epsom.....										1		
Franklin.....									1	2	6	
Henniker.....												
Hill.....												
Hooksett.....									2	1		
Hopkinton.....												
Loudon.....												
Newbury.....										1		1
New London.....												1
Northfield.....										2		
Pembroke.....	1									3		
Pittsfield.....									1	3		
Salisbury.....												
Sutton.....									1			
Warner.....												
Webster.....										1		
Wilmot.....									2			
Total.....	6		1	1					12	27	8	9

No. 7.—Continued.

Counties, 1906.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																								XIV. ILL-DEFINED DISEASES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
154. Senile debility.		155. Suicide by poison.																								156. Suicide by asphyxia.		157. Suicide by hanging or strangulation.		158. Suicide by drowning.		159. Suicide by firearms.		160. Suicide by cutting instruments.		161. Suicide by jumping from high places.		162. Suicide by crushing.		163. Other suicides.		164. Fractures.		165. Dislocations.		166. Other accidental traumas.		167. Burns and scalds.		168. Burns from corrosive substances.		169. Sunstroke.		170. Freezing.		171. Electric shock.		172. Accidental drowning.		173. Inanition (starvation).		174. Absorption of deleterious gases (non-suicidal).		175. Other acute poisonings.		176. Other external violence.		177. Dropsy.		178. Sudden death.		179. Causes of death unspecified or ill-defined.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Table  
Causes of Death arranged by Towns and

	I. GENERAL DISEASES.																							
TOWNS IN HILLSBOROUGH COUNTY.	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlat fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Military fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicæmia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.
Amherst.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Antrim.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bedford.....	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
Bennington.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.
Brookline.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Deering.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Francesstown.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Goffstown.....	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17	.	.
Greenfield.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.
Greenville.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
Hancock.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
Hillsborough.....	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	7	1	.
Hollis.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
Hudson.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Litchfield.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lyndeborough.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.
Manchester.....	6	1	.	.	.	1	5	28	16	5	.	.	.	4	.	7	.	.	.	.	1	94	5	1
Mason.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Merrimack.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Milford.....	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.
Mont Vernon.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nashua.....	4	.	.	.	.	6	1	.	3	.	1	1	.	.	.	3	.	.	.	.	.	31	1	3
New Boston.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
New Ipswich.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.
Pelham.....	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Peterborough.....	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.
Sharon.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Temple.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Weare.....	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.
Wilton.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Windsor.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total.....	11	1	.	1	2	24	34	16	9	.	1	6	.	4	.	16	.	.	.	.	1	183	10	3





Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro-spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alienation.	69. Epilepsy.	70. Convulsions; (non-puerperal; five years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nervous system.	75. Diseases of the eye.	76. Diseases of the ear.
Amherst.....						1				1								
Antrim.....						1												
Bedford.....		2				1							1					
Bennington.....						1												
Brookline.....																		
Deering.....								1									1	
Francestown.....								1										
Goffstown.....		2		1		7	1	1	2	4		1						
Greenfield.....																		
Greenville.....		2				2											1	
Hancock.....		1		1		1												
Hillsborough.....		1		1		3	1			1								
Hollis.....						3												
Hudson.....						2												
Litchfield.....																		
Lyndeborough.....		1				1												
Manchester.....	2	83		2	5	44	2	16	4	2	7		16		1	9		
Mason.....							1											
Merrimack.....		1									2							
Milford.....		4				5	2						1					
Mont Vernon.....						1												
Nashua.....		17		2	5	20	1	4			1		8				3	
New Boston.....																		
New Ipswich.....						3											1	
Pelham.....						1												
Peterborough.....						2	1										1	
Sharon.....																		
Temple.....																		
Weare.....						5												
Wilton.....		1				3	2											
Windsor.....																		
Total.....	2	115		6	12	107	5	28	5	5	15		28		1	16		

No. 7.—Continued.

Counties, 1906.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	1	1	...	1	...	...	...	...	...	...	...	1	1	...	6	1	...	...	...	...	1
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	...	...	...	...
...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	6	...	...	1	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...
...	1	7	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	2	2	3	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...
...	8	81	3	4	9	...	...	1	...	8	5	1	34	5	32	87	4	9	1	3	2	1
...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	7	...	...	...	...	...	...	...	...	...	...	6	...	...	...	...	...	...	...	...	...
...	6	32	4	4	1	...	...	2	...	1	...	...	6	4	6	26	1	4	...	1	...	...
...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	2	3	...	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...
...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	22	169	10	10	15	...	...	4	...	9	6	1	55	11	47	153	9	18	1	4	2	3

Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Amherst .....				1		1													1
Antrim .....						1													
Bedford .....						1													
Bennington .....						1		1											
Brookline .....						1													
Deering .....						1													
Francestown .....																			
Goffstown .....				2		1							1						
Greenfield .....							1												
Greenville .....				4		3							1				1		
Hancock .....																			
Hillsborough .....						1	2		1				1						
Hollis .....							1								1				
Hudson .....				1															
Litchfield .....																			
Lyndeborough .....						1	1			1									
Manchester .....	3	1	20	99		7		9	2	1			7	3	7	19			8
Mason .....																	1		
Merrimack .....																			
Milford .....						2	2	1											
Mont Vernon .....																			
Nashua .....	2		10	49		5		6	2	2			5	1	2	3			3
New Boston .....																			
New Ipswich .....						2													
Pelham .....						1										2			
Peterborough .....						2							1						
Sharon .....																			
Temple .....																			
Weare .....				2															
Wilton .....				1	2										2	1	1		
Windsor .....																			
Total .....	5	1	41	167	20	19	4	3	16	4	13	1	27	1	27	1	1	12	



Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Amherst.....							1		1	1		1
Antrim.....												2
Bedford.....										1		
Bennington.....										1		
Brookline.....			1									
Deering.....												
Francestown.....												
Goffstown.....	1									3		
Greenfield.....												
Greenville.....										4		
Hancock.....										2		
Hillsborough.....	1				1				1			
Hollis.....												
Hudson.....									1	1		
Litchfield.....												
Lyndeborough.....												
Manchester.....	5		1		2				9	94	5	19
Mason.....												
Merrimack.....												
Milford.....	3								2	1	1	
Mont Vernon.....												
Nashua.....	1		1		1				4	28	1	2
New Boston.....												
New Ipswich.....												
Pelham.....												
Peterborough.....	1									1		
Sharon.....												
Temple.....												
Weare.....										1		
Wilton.....					1							
Windsor.....												
Total.....	12		3		5		1		18	138	7	24





Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	I. GENERAL DISEASES.																									
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicæmia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomyces, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.		
Alstead .....						1															3					
Chesterfield.....	1																									
Dublin.....																										
Fitzwilliam.....						1										1					2	1				
Gilsum.....																					1					
Harrisville.....																										
Hinsdale.....	1	1																			3					
Jaffrey.....						1	3	1													3					
Keene.....	1									1			1								2					
Marlborough.....						1				1											2			1		
Marlow.....																					1					
Nelson.....																										
Richmond.....																										
Rindge.....																										
Roxbury.....																										
Stoddard.....																								1		
Sullivan.....																										
Surry.....																										
Swansey.....						1			3				1													
Troy.....						1							1									5	1			
Walpole.....						1	1									1					5					
Westmoreland.....											1													2		
Winchester.....	1																				1					
Total.....	4	1				6	5	1	5		1	2				2					35	2		4		



Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Alstead .....	1				1	2								1				
Chesterfield .....																		
Dublin .....	1																	
Fitzwilliam .....					1											1		
Gilsum .....					4													
Harrisville .....																		
Hinsdale .....	4				4								1					
Jaffrey .....	1			1														
Keene .....	8				1	6		8					4			1		
Marlborough .....													1					
Marlow .....																		
Nelson .....								1								1		
Richmond .....																		
Rindge .....					2													
Roxbury .....																		
Stoddard .....																		
Sullivan .....																		
Surry .....																		
Swanzey .....																		
Troy .....					1							1	2					
Walpole .....					5								1					
Westmoreland .....					4						1							
Winchester .....				2	3			2					1					
Total .....	15		1	3	29		9	2		1	1	11			8			



Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Alstead...					1														
Chesterfield...						2					1								
Dublin...						1													
Fitzwilliam...						2													
Gilsum...													1						
Harrisville...						2													
Hinsdale...				2															
Jaffrey...						3													
Keene...				5	6	3	3		1	1									
Marlborough...				1	1								2						1
Marlow...						1			1						1				
Nelson...																			
Richmond...									1										
Rindge...																			
Roxbury...																			
Stoddard...						1													
Sullivan...																			
Surry...																			
Swanzey...						1	1			1									
Troy...										1									
Walpole...							1												
Westmoreland...						2							1						
Winchester...				1	1														
Total. ....				10	20	6		5	1	1			4		2	1			2

No. 7.—Continued.

Counties, 1906.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.					
19. Acute nephritis.					
20. Bright's disease.			2		
21. Other diseases of the kidneys.			2		
22. Calculi of the urinary tract.					
23. Diseases of the bladder.					
24. Diseases of the urethra.					
25. Diseases of the prostate.					
26. Non-venereal diseases of the male genital organs.					
27. Metritis.					
28. Uterine hemorrhage (non-puerperal).					
29. Uterine tumor.					
30. Other diseases of the uterus.			1		
31. Cysts and other tumors of the ovary.			1		
32. Other diseases of the female genital organs.					
33. Non-puerperal diseases of the breast.					
34. Accidents of pregnancy.					
35. Puerperal hemorrhage.					
36. Other accidents of labor.					
37. Puerperal septicemia.			1		
38. Puerperal albuminuria and convulsions.					
39. Phlegmasia alba dolens (puerperal).					
40. Other puerperal accidents.					
41. Puerperal diseases of the breast.					



Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Alstead.....	1											
Chesterfield.....												
Dublin.....									1			
Fitzwilliam.....									1	2		
Gilsum.....												
Harrisville.....									1	1		1
Hinsdale.....										3		
Jaffrey.....										2	1	
Keene.....	2								2	4	3	1
Marlborough.....										1		
Marlow.....	1											
Nelson.....												
Richmond.....												
Rindge.....												
Roxbury.....												
Stoddard.....										1		
Sullivan.....												
Surry.....												
Swansey.....												
Troy.....									1			
Walpole.....										1		
Westmoreland.....									1			
Winchester.....									1	1		
Total.....	4								8	16	4	3



Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	I. GENERAL DISEASES.																											
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.				
Acworth.....	1																											
Charlestown.....																						3						
Claremont.....	1			1				2														11	1	2				
Cornish.....																												
Croydon.....									1																			
Goshen.....																						1						
Grantham .....									1																			
Langdon .....																												
Lempster.....																												
Newport .....	1															1						6						
Plainfield.....																						2						
Springfield.....																												
Sunapee .....																						1						
Unity.....										2												3						
Washington.....																												
Total.....	3			1				2	2		2					1					27	1	2					



Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Acworth.....							1											
Charlestown.....	1					2												
Claremont.....	3		2		10		2					1	1					
Cornish.....							1											
Croydon.....																		
Goshen.....						1	1	1										
Grantham.....																		
Langdon.....																		
Lempster.....																		
Newport.....						3											1	
Plainfield.....						2											1	
Springfield.....																		
Sunapee.....								2										
Unity.....						1												
Washington.....						1												
Total.....	4	2		20	1	7						1	1			2		

No. 7.—Continued.

Counties, 1906.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.											
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	1	1	2	...	...	...	...	...	...	...
...	...	15	...	1	1	...	...	1	...	...	...	...	3	3	5	1	...	...	...	...	...	...
...	...	3	1	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	6	...	...	1	...	...	...	...	...	...	...	1	...	9	...	...	1	...	1	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	1	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...
2	2	35	2	1	2	...	...	1	...	...	...	...	8	8	20	1	1	...	1	...	...	...



Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis. (under two years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Acworth.....						1													
Charlestown.....						1													
Claremont.....					2	1	4										3		1
Cornish.....				1															
Croydon.....							1												
Goshen.....																			
Grantham.....				1															
Langdon.....																			
Lempster.....																			
Newport.....					2	1													
Plainfield.....																1			
Springfield.....																			
Sunapee.....																			
Unity.....						1							1						
Washington.....						1													
Total.....					6	8	5						1			1	3		1

No. 7.—Continued.

## Counties, 1906.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.													VII. THE PUERPERAL STATE.									
119. Acute nephritis.	120. Bright's disease.	121. Other diseases of the kid- neys.	122. Calculi of the urinary tract.	123. Diseases of the bladder.	124. Diseases of the urethra.	125. Diseases of the prostate.	126. Non-venereal diseases of the male genital organs.	127. Metritis.	128. Uterine hemorrhage (non- puerperal).	129. Uterine tumor.	130. Other diseases of the uterus.	131. Cysts and other tumors of the ovary.	132. Other diseases of the fe- male genital organs.	133. Non-puerperal diseases of the breast.	134. Accidents of pregnancy.	135. Puerperal hemorrhage.	136. Other accidents of labor.	137. Puerperal septicemia.	138. Puerperal albuminuria and convulsions.	139. Phlegmasia alba dolens (puerperal).	140. Other puerperal accidents.	141. Puerperal diseases of the breast.
1	2																					
	1																		1			
	8	1															1				1	
	2																	1				
							1															

Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.	150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Acworth .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlestown.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claremont.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	.....	.....
Cornish .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Croydon.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goshen ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grantham .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Langdon .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lempster .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newport .....	.....	.....	.....	.....	.....	.....	.....	.....	2	2	1	.....
Plainfield.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springfield .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Sunapee .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Unity .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Washington .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	.....	.....	.....	.....	.....	5	8	1	.....

No. 7.—Continued.

Counties, 1906.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																								XIV. ILL-DEFINED DISEASES.	
154. Senile debility.		155. Suicide by poison.	156. Suicide by asphyxia.	157. Suicide by hanging or strangulation.	158. Suicide by drowning.	159. Suicide by firearms.	160. Suicide by cutting instruments.	161. Suicide by jumping from high places.	162. Suicide by crushing.	163. Other suicides.	164. Fractures.	165. Dislocations.	166. Other accidental traumas.	167. Burns and scalds.	168. Burns from corrosive substances.	169. Sunstroke.	170. Freezing.	171. Electric shock.	172. Accidental drowning.	173. Inanition (starvation).	174. Absorption of deleterious gases (non-suicidal).	175. Other acute poisonings.	176. Other external violence.	177. Dropsy.	178. Sudden death.	179. Causes of death unspecified or ill-defined.	
1																			1						1		
4													2								1						2
												1															

Table

Causes of Death arranged by Towns and

TOWNS IN GRAFTON COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Alexandria.....	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ashland.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bath.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Benton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bethlehem.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bridgewater.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Bristol.....	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Campton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Caanan.....	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dorchester.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Easton.....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ellsworth.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Enfield.....	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Franconia.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grafton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Groton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hanover.....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Haverhill.....	2	..	1	..	..	3	..	..	..	..	..	2	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Hebron.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Holderness.....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Landaff.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lebanon.....	1	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Lincoln.....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lisbon.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Littleton.....	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Livermore.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lyman.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lyme.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Monroe.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Orange.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Orford.....	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Piermont.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Plymouth.....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Rumney.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Thornton.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Warren.....	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Waterville.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wentworth.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Woodstock.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	12	..	1	1	1	7	1	2	..	1	4	..	1	..	6	..	..	..	..	..	37	..	3	..	..	..	..	..	..





Table

Causes of Death arranged by Towns and

TOWNS IN GRAFTON COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Alexandria.....	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..
Ashland.....	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	2	..	..
Bath.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Benton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bethlehem.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..
Bridgewater.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bristol.....	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Campton.....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Canaan.....	..	..	..	..	..	1	..	2	..	..	..	..	1	..	..	..	..	..
Dorchester.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Easton.....	..	..	..	..	..	1	..	2	..	..	..	1	..	..	..	..	..	..
Ellsworth.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Enfield.....	..	..	..	..	..	1	..	1	..	..	..	1	1	..	..	1	..	..
Franconia.....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Grafton.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Groton.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..
Hanover.....	1	..	..	..	..	4	..	..	..	..	..	1	..	..	..	1	..	..
Haverhill.....	3	..	..	..	..	6	..	..	..	..	..	1	..	..	..	..	..	..
Hebron.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Holderness.....	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Landaff.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Lebanon.....	4	..	..	..	..	3	..	2	..	..	..	..	..	..	..	..	..	..
Lincoln.....	4	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Lisbon.....	2	..	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..	..
Littleton.....	..	..	..	1	5	5	..	..	..	..	..	2	..	..	..	..	..	..
Livermore.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lyman.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lyme.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Monroe.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Orange.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Orford.....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	1	..	..	..
Piermont.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Plymouth.....	1	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..
Rumney.....	1	..	..	..	2	..	..	..	..	..	..	..	1	..	..	..	..	..
Thornton.....	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Warren.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Waterville.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wentworth.....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Woodstock.....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	16	5	..	2	49	17	..	..	..	..	..	9	1	..	7	..	..	..



Table

Causes of Deaths arranged by Towns and

TOWNS IN GRAFTON COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Alexandria . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ashland . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bath . . . . .	.	.	.	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Benton . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bethlehem . . . . .	.	.	.	1	1	1	.	.	1	.	.	.	.	.	1	.	.	1	.
Bridgewater . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bristol . . . . .	.	.	.	.	2	1	1	.	.	1	.	.	.	.	.	.	.	.	.
Campton . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Canaan . . . . .	.	.	.	1	.	1	.	.	1	1	.	.	.	.	.	.	.	.	1
Dorchester . . . . .	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.
Easton . . . . .	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Ellsworth . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Enfield . . . . .	.	.	1	.	.	2	1	.	.	.	.	.	.	.	.	.	2	.	.
Franconia . . . . .	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Grafton . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1
Groton . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Hanover . . . . .	.	.	.	1	.	.	1	.	2	.	.	.	.	.	.	.	5	.	1
Haverhill . . . . .	.	1	.	.	3	2	.	.	.	.	1	.	.	.	.	.	2	.	.
Hebron . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Holderness . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Landaff . . . . .	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Lebanon . . . . .	.	.	.	.	.	3	4	.	2	.	.	.	.	.	.	.	1	.	.
Lincoln . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lisbon . . . . .	.	.	.	.	.	2	2	.	.	.	.	.	.	.	1	.	.	.	.
Littleton . . . . .	.	.	.	.	5	6	5	.	1	.	.	.	.	.	.	2	.	.	.
Livermore . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lyman . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lyme . . . . .	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	1
Monroe . . . . .	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orange . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orford . . . . .	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Piermont . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Plymouth . . . . .	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rumney . . . . .	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thornton . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Warren . . . . .	.	.	.	.	1	1	2	.	.	.	.	.	.	.	.	.	.	.	1
Waterville . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wentworth . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Woodstock . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total . . . . .	1	6	16	27	17	17	..	9	3	1	....	1	1	3	..	16	....	5	



Table

## Causes of Deaths arranged by Towns and

TOWNS IN GRAFTON COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Alexandria .....	1										2	1
Ashland .....											2	
Bath .....												
Benton .....												
Bethlehem .....	2								1	1		
Bridgewater .....												
Bristol .....												
Campton .....					1						1	
Canaan .....											1	
Dorchester .....												
Easton .....												
Ellsworth .....												
Enfield .....	1			1							1	
Franconia .....									1			
Grafton .....												
Groton .....											1	
Hanover .....									1		4	
Haverhill .....	2										7	
Hebron .....												
Holderness .....												
Landaff .....											2	
Lebanon .....	1			1					1		3	
Lincoln .....												
Lisbon .....											1	
Littleton .....	2										3	
Livermore .....												
Lyman .....												
Lyme .....												
Monroe .....											1	
Orange .....												
Orford .....												
Piermont .....												
Plymouth .....									1		3	
Rumney .....				1							1	
Thornton .....												
Warren .....											1	
Waterville .....												
Wentworth .....	1											
Woodstock .....	1								1			
Total .....	11			3	1				6	35		1

No. 7.—Continued.

Counties, 1906.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																									XIV. ILL-DEFINED DISEASES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
154. Senile debility.		155. Suicide by poison.																									156. Suicide by asphyxia.		157. Suicide by hanging or strangulation.		158. Suicide by drowning.		159. Suicide by firearms.		160. Suicide by cutting instruments.		161. Suicide by jumping from high places.		162. Suicide by crushing.		163. Other suicides.		164. Fractures.		165. Dislocations.		166. Other accidental traumas.		167. Burns and scalds.		168. Burns from corrosive substances.		169. Sunstroke.		170. Freezing.		171. Electric shock.		172. Accidental drowning.		173. Inanition (starvation).		174. Absorption of deleterious gases (non-suicidal).		175. Other acute poisonings.		176. Other external violence.		177. Dropsy.		178. Sudden death.		179. Causes of death unspecified or ill-defined.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Table

Causes of Death arranged by Towns and

TOWNS IN COOS COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Berlin.....	10			1				1						1		1						10							
Carroll.....																						1							
Clarksville.....									1													1							
Colebrook.....									1																				
Columbia.....					1																	1							
Dalton.....	1																						1						
Dummer.....																								1					
Errol.....																													
Gorham.....	1			1												1						1							
Jefferson.....												1										1							
Lancaster.....	1																					1							
Milan.....																													
Millsfield.....																													
Northumberland.....																						1							
Pittsburg.....													1																
Randolph.....																						1							
Shelburne.....																													
Stark.....																													
Stewartstown.....																						3							
Stratford.....	2																												
Whitefield.....																							2						
Total.....	15			2	1			1	2			1		2		2		2				23	1	1					



Table

Causes of Death by Towns and

TOWNS IN COOS COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Berlin.....	19				2	3							5					
Carroll.....						1												
Clarksville.....					1													
Colebrook.....	2						1						1					
Columbia.....	2															1		
Dalton.....						1												
Dummer.....																		
Errol.....						1												
Gorham.....	1					5	1											
Jefferson.....							3											
Lancaster.....	2					4					1		1			1		
Milan.....	1				1													
Millsfield.....													1					
Northumberland.....	1					3												
Pittsburg.....																		
Randolph.....																		
Shelburne.....																		
Stark.....	1						1											
Stewartstown.....						1	3						1					
Stratford.....																1		
Whitefield.....						5												
Total.....	27				4	24	9				1		9			3		



Table

Causes of Deaths arranged by Towns and

TOWNS IN COOS COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Berlin.....	..	..	..	..	1	32	1	..	..	2	..	..	..	..	3	..	2	..	..
Carroll.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Clarksville.....	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Colebrook.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Columbia.....	..	..	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..
Dalton.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Dummer.....	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Errol.....	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gorham.....	..	..	..	..	..	5	1	..	..	..	..	..	..	..	..	..	..	..	..
Jefferson.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lancaster.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..
Milan.....	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	1	..
Millsfield.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Northumberland.....	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..
Pittsburg.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Randolph.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Shelburne.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stark.....	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Stewartstown.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..
Stratford.....	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Whitefield.....	..	..	1	..	1	1	1	..	..	..	..	..	1	1	3	1	1	1	1
Total.....	..	..	1	5	43	5	5	..	2	..	..	..	4	1	3	8	8	4	4





Table

Causes of Death arranged by Towns and

TOWNS IN COOS COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Berlin.....	1			1					1	22	4	
Carroll.....										1		
Clarksville.....												
Colebrook.....										1		
Columbia.....												
Dalton.....												
Dummer.....												
Errol.....												
Gorham.....										1		
Jefferson.....												
Lancaster.....												
Milan.....												
Millsfield.....												
Northumberland.....											1	
Pittsburg.....												
Randolph.....												
Shelburne.....												
Stark.....										1	1	
Stewartstown.....									1			
Stratford.....										3		
Whitefield.....									2	2		
Total.....	1			1					4	31	6	

No. 7.—Continued.

Counties, 1906.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																									XIV. ILL-DEFINED DISEASES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
154. Senile debility.		155. Suicide by poison.																									156. Suicide by asphyxia.		157. Suicide by hanging or strangulation.		158. Suicide by drowning.		159. Suicide by firearms.		160. Suicide by cutting instruments.		161. Suicide by jumping from high places.		162. Suicide by crushing.		163. Other suicides.		164. Fractures.		165. Dislocations.		166. Other accidental traumas.		167. Burns and scalds.		168. Burns from corrosive substances.		169. Sunstroke.		170. Freezing.		171. Electric shock.		172. Accidental drowning.		173. Inanition (starvation).		174. Absorption of deleterious gases (non-suicidal).		175. Other acute poisonings.		176. Other external violence.		177. Dropsy.		178. Sudden death.		179. Causes of death unspecified or ill-defined.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Table  
Recapitulation

COUNTIES.	I. GENERAL DISEASES.																											
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.				
Rockingham .....	12	..	..	..	1	4	4	4	7	..	..	..	..	..	..	5	..	..	..	..	1	72	4	5				
Strafford.....	9	2	..	..	2	5	..	..	7	..	1	5	..	1	..	4	..	..	..	..	1	56	5	2				
Belknap .....	1	..	..	..	5	1	1	..	..	..	1	6	..	..	..	1	..	..	..	..	..	80	2	2				
Carroll.....	3	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15	1	..				
Merrimack .....	6	1	..	1	3	7	6	2	12	..	3	6	..	2	..	11	..	..	..	..	..	60	1	5				
Hillsborough.....	11	1	..	1	2	24	34	16	9	..	1	6	..	4	..	16	..	..	..	..	1	188	10	3				
Cheshire.....	4	1	..	..	6	5	1	5	..	1	2	..	..	..	..	2	..	..	..	..	..	35	2	4				
Sullivan.....	3	..	..	1	..	..	..	2	2	..	2	..	..	..	..	1	..	..	..	..	..	27	1	2				
Grafton.....	12	..	..	1	1	1	7	1	2	..	1	4	..	1	..	6	..	..	..	..	..	37	..	3				
Coös.....	15	..	..	2	1	..	..	1	2	..	..	1	..	2	..	2	..	..	..	..	..	23	1	1				
Total.....	76	7	..	6	10	53	58	28	46	..	10	30	..	10	..	48	..	..	..	..	3	538	27	27				

No. 7.  
by Counties.

## I. GENERAL DISEASES.—Continued.

30. Pott's disease.	31. Cold abscess, abscess by congestion.	32. White swelling.	33. Tuberculosis of other organs.	34. General tuberculosis.	35. Scrofula.	36. Syphilis.	37. Gonorrhea (five years and over).	38. Gonorrhea (under five years).	39. Cancer and other malignant tumors of the buccal cavity.	40. Cancer of stomach and liver.	41. Cancer of intestines.	42. Cancer of genital organs.	43. Cancer of breast.	44. Cancer of skin.	45. Cancer of other or unspecified organs.	46. Tumors.	47. Acute articular rheumatism.	48. Chronic rheumatism and gout.	49. Scurvy.	50. Diabetes.	51. Exophthalmic goiter.	52. Addison's disease.	53. Leukemia.	54. Anemia, chlorosis.	55. Other general diseases.	56. Acute and chronic alcoholism.	57. Chronic lead poisoning.	58. Other chronic poisonings.
1	1	1	1	1	1	1	1	1	1	15	6	4	2	20	3	2	1	7	7	1	2	4	1	2	4	1	1	1
1	1	1	4	1	1	1	1	1	1	12	4	3	1	6	2	2	1	5	5	5	5	5	5	5	5	5	5	5
1	1	1	1	1	1	1	1	1	1	3	2	2	1	18	1	1	1	2	2	2	4	4	4	4	4	4	4	4
1	1	1	1	1	1	1	1	1	1	6	3	1	1	5	1	1	1	2	2	2	3	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1	1	1	8	2	3	2	3	20	1	1	7	7	2	6	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3	3	3	35	13	8	6	3	25	4	15	1	21	1	2	2	5	5	5	5	5	5
1	1	1	1	1	1	1	1	1	1	11	7	6	2	1	8	2	2	2	2	2	1	1	3	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	4	2	1	1	2	2	2	2	2	2	5	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	18	4	2	3	20	2	8	1	6	6	1	7	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	3	3	3	1	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	7	7	7	7	7	7	7	7	7	115	46	31	20	8	129	9	34	4	58	4	5	4	46	1	23	3	3	3

Table  
Recapitulation

COUNTIES.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																		
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alienation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nervous system.	75. Diseases of the eye.	76. Diseases of the ear.	
Rockingham.....	3	14	3	2	3	65	6	19	3	7	1	2	14	..	..	2	..	..	
Strafford.....	2	21	..	..	3	34	2	9	1	1	..	2	1	1	..	11	..	..	
Belknap .....	1	8	..	..	..	24	..	19	1	..	2	..	5	..	..	1	..	..	
Carroll.....	..	6	..	1	1	19	2	2	3	1	1	1	2	..	..	2	..	..	
Merrimack.....	1	20	..	2	1	75	1	32	3	10	3	1	6	1	..	16	..	..	
Hillsborough.....	2	115	..	6	12	107	5	28	5	5	15	..	28	..	1	16	..	..	
Cheshire.....	..	15	..	1	3	29	..	9	2	..	1	1	11	..	..	3	..	..	
Sullivan.....	..	4	..	2	..	20	1	7	..	..	..	1	1	..	..	2	..	..	
Grafton.....	..	16	5	..	2	49	..	17	..	..	..	..	9	1	..	7	..	..	
Coös.....	2	27	..	..	4	24	..	9	..	..	1	..	9	..	..	3	..	..	
Total.....	11	246	8	14	29	446	17	151	18	24	24	8	87	3	1	63	..	..	

No. 7.—Continued.

by Counties.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
77. Pericarditis.			78. Acute endocarditis.			79. Organic diseases of the heart.			80. Angina pectoris.		81. Diseases of the arteries.		82. Embolism and thrombosis.		83. Diseases of the veins.		84. Diseases of the lymphatic system.		85. Hemorrhages.		86. Other diseases of the circulatory system.		87. Laryngitis.		88. Other diseases of the larynx.		89. Diseases of the thyroid body.		90. Acute bronchitis.		91. Chronic bronchitis.		92. Broncho-pneumonia.		93. Pneumonia.		94. Pleurisy.		95. Congestion and apoplexy of the lungs.		96. Gangrene of the lungs.		97. Asthma.		98. Pulmonary emphysema.		99. Other diseases of the respiratory system.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
4	11	92	9	9	6	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....</



Table  
Recapitulation

COUNTIES.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhœa and enteritis (under 2 years).	106. Diarrhœa and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Rockingham .....	1	1	19	27	4	..	5	1	...	...	6	1	1	1	7	...	1		
Strafford .....	..	..	7	53	5	..	5	...	1	...	2	1	6	..	1	...	1		
Belknap.....	..	1	2	11	10	5	..	4	...	...	2	1	..	..	4	...	3		
Carroll.....	2	..	7	7	5	..	3	2	...	...	..	..	1	..	1	...	1		
Merrimack .....	1	..	19	37	7	..	6	2	...	...	10	6	3	..	12	...	4		
Hillsborough.....	5	..	1	41	168	19	..	19	4	3	...	16	4	13	1	27	...	12	
Cheshire.....	..	..	..	10	20	6	..	5	1	1	...	4	..	2	..	1	...	2	
Sullivan.....	..	..	..	6	6	5	..	...	..	...	1	..	..	1	3	...	1		
Grafton.....	1	..	6	16	27	17	..	9	3	1	..	1	1	3	..	16	..	5	
Coös .....	..	..	1	5	43	5	..	..	2	...	4	1	3	..	8	...	4		
Total.....	10	1	11	141	398	78	..	56	15	6	...	46	15	32	3	80	...	34	

No. 7.—1906.—Continued.

by Counties.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.														VII. THE PUERPERAL STATE.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
119. Acute nephritis.		120. Bright's disease.		121. Other diseases of the kid- neys.		122. Calculi of the urinary tract.		123. Diseases of the bladder.		124. Diseases of the urethra.		125. Diseases of the prostate.		126. Non-venereal diseases of the male genital organs.		127. Metritis.		128. Uterine hemorrhage (non- puerperal.		129. Uterine tumor.		130. Other diseases of the uterus.		131. Cysts and other tumors of the ovary.		132. Other diseases of the fe- male genital organs.		133. Non-puerperal diseases of the breast.		134. Accidents of pregnancy.		135. Puerperal hemorrhage.		136. Other accidents of labor.		137. Puerperal septicemia.		138. Puerperal albuminuria and convulsions.		139. Phlegmasia alba dolens (puerperal).		140. Other puerperal accidents.		141. Puerperal diseases of the breast.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
1	47	...	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	1	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Table  
Recapitulation

COUNTIES.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Rockingham.....	7	...	...	1	...	...	...	...	10	22	...	5
Strafford .....	1	...	...	1	1	...	...	...	6	25	...	6
Belknap .....	...	...	1	...	...	1	...	...	3	16	...	...
Carroll.....	1	...	...	...	...	...	...	...	3	4	...	2
Merrimack .....	6	...	1	1	...	...	...	...	12	27	8	9
Hillsborough.....	12	...	3	...	5	...	1	...	18	138	7	24
Cheshire.....	4	...	...	...	...	...	...	...	8	16	4	3
Sullivan .....	...	...	...	...	...	...	...	...	5	8	1	...
Grafton .....	11	...	...	3	1	...	...	...	6	35	...	1
Coös.....	1	...	...	1	...	...	...	...	4	31	6	...
Total.....	43	...	5	7	7	1	1	...	75	322	26	50

No. 7.—1906.—*Concluded.*

by Counties.

	XII. OLD AGE.										XIII. EXTERNAL CAUSES.										XIV. ILL-DEFINED DISEASES.									
	154. Senile debility.																													
	155. Suicide by poison.										156. Suicide by asphyxia.										157. Suicide by hanging or strangulation.									
	158. Suicide by drowning.										159. Suicide by firearms.										160. Suicide by cutting instruments.									
	161. Suicide by jumping from high places.										1 2. Suicide by crushing.										163. Other suicides.									
	164. Fractures										165. Dislocations.										166. Other accidental traumas.									
	167. Burns and scalds.										168. Burns from corrosive substances.										169. Sunstroke.									
	170. Freezing.										171. Electric shock.										172. Accidental drowning.									
	173. Inanition (starvation).										174. Absorption of deleterious gases (non-suicidal).										175. Other acute poisonings.									
	176. Other external violence.										177. Dropsy.										178. Sudden death.									
	179. Causes of death unspecified or ill-defined.																													
64	..	..	2	..	3	..	..	..	..	..	2	..	9	7	..	..	..	..	..	..	1	4	..	2	4	3	3	..	..	20
43	1	..	1	..	..	..	..	..	..	..	4	..	11	4	..	..	..	..	..	..	2	6	..	1	1	5	3	..	..	14
48	..	..	1	..	1	..	..	..	..	..	1	..	4	..	..	..	..	..	..	..	1	6	..	..	2	2	3	..	..	10
15	..	..	..	..	..	..	..	..	..	..	1	..	4	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	4
66	..	1	1	..	..	..	..	..	..	..	3	6	7	2	..	..	..	..	..	..	6	..	2	3	7	2	..	..	..	11
68	4	..	3	1	2	1	..	..	..	..	2	19	14	6	..	..	..	..	..	..	15	..	4	8	9	2	..	..	..	47
43	..	..	2	..	..	1	..	..	..	..	1	4	12	2	..	..	..	..	..	..	4	..	..	3	3	..	..	..	..	6
17	..	..	1	..	..	..	..	..	..	..	1	..	6	..	..	..	..	..	..	..	1	..	1	2	1	3	..	..	..	3
39	..	..	..	..	..	..	..	..	..	..	2	6	17	3	..	..	..	..	..	..	1	8	..	..	4	2	1	..	..	10
20	1	..	1	..	..	..	..	..	..	..	3	..	7	1	..	..	..	..	..	..	1	3	..	..	2	3	..	..	..	13
423	6	1	12	1	6	2	..	..	..	..	8	47	91	25	..	..	..	..	..	..	6	54	..	10	30	35	17	..	..	138

Table No. 8.  
Deaths by Ages, Sex and Months, by Counties and Towns, 1906.  
(Not including still births.)

TOWNS IN ROCKINGHAM COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Atkinson.	Males.....	1								2	1	1				1	1	1	1								2		6	8
	Females.....							1													1	1							2	
Auburn.	Males.....	2	2					1	2	1	4	2			2					2	2	2	3	2			1		14	21
	Females.....				1	1			2	1	2					1			1	1					1	3			7	
Brentwood.	Males.....					5	1	2	1	4	5	3		3		3	4	1		1		1		2	2	4	3		21	41
	Females.....	1			2			1		4	9	3		1		1		4	2		3	1		1	2	3	3		20	
Candia.	Males.....	1					1			4	2	2					1			2	3	2		1		1			10	22
	Females.....	1			1			1	1	2	2	4	1					1	1	1	3		1		1	1			12	
Chester.	Males.....	1								1	2				1								1	1			1		4	8
	Females.....									1	2	1		1		1		1		1						2			4	
Danville.	Males.....				1					1	1	1				1					1								4	7
	Females.....				1					1	1						1				1	2		1		1			3	
Deerfield.	Males.....						1	4	2	5	3							1	1	1	4	1			4	2	1		15	24
	Females.....				1			1	1	3	3				1		1	4				1			1	1			9	
Derry.	Males.....	10	1	1	1	1	3	4	3	5	5	1		2		2	1	2	3	4	3	3	4	1	5	2	6		86	67
	Females.....	6	2	2	1	2	4	3	2	4	8			2		2	1	3	6		2	4	4	4	3		2		31	
East Kingston.	Males.....															1	1												2	7
	Females.....						2			3								1		1							1		5	

## DEATHS.

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Epping	Males.....	6	2	1	1	2	1	2	1	2	4	3	2	1	1	1	2	2	3	3	3	3	2	25
	Females....	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	7	
Exeter	Males.....	6	2	2	2	1	2	4	6	2	2	2	2	1	4	3	2	3	4	3	1	3	4	30
	Females....	7	1	2	4	3	3	7	3	6	6	4	4	2	4	3	4	4	6	5	4	2	7	
Fremont	Males.....	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	4	
	Females....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	
Greenland	Males.....	2	1	1	1	1	1	3	1	2	1	1	1	1	1	1	1	1	1	1	1	1	6	
	Females....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	
Hampstead	Males.....	1	1	1	1	1	1	1	4	1	1	4	1	1	1	1	1	1	1	1	1	1	8	
	Females....	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	4	
Hampton	Males.....	1	1	1	2	2	1	1	1	5	2	1	2	1	1	1	3	2	2	2	1	1	15	
	Females....	1	2	1	1	1	1	1	2	1	2	3	1	2	3	1	1	1	3	2	1	4	16	
Hampton Falls	Males.....	2	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	2	4	
	Females....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	
Kensington	Males.....	1	1	1	1	1	1	3	2	2	1	3	2	1	1	1	2	1	1	2	1	1	7	
	Females....	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	3	1	1	1	1	1	7	
Kingston	Males.....	1	1	1	1	1	1	1	2	3	1	2	3	1	2	1	1	2	1	1	1	1	8	
	Females....	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	8	
Londonderry	Males.....	1	1	1	1	1	1	3	3	3	1	3	3	1	1	1	1	1	1	1	1	2	10	
	Females....	2	1	1	2	1	1	1	2	3	1	2	3	1	1	1	1	1	1	3	2	1	12	
Newcastle	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
	Females....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
Newfields	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	
	Females....	1	1	1	1	1	1	1	3	3	3	3	1	2	1	1	1	1	1	1	1	1	7	
Newington	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	
	Females....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
Newmarket	Males.....	6	1	1	2	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	4	3	1	18
	Females....	3	3	1	1	1	1	2	2	5	4	3	3	3	3	3	6	1	1	2	2	3	28	



Table No. 8.—1906.—Continued.

TOWNS IN ROCKINGHAM COUNTY. —Continued.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Newton.....	Males.....	...	...	...	...	...	1	1	1	1	2	1	...	...	...	...	1	1	...	1	...	1	...	...	1	...	1	...	3	8
	Females.....	...	...	...	...	...	1	2	2	...	2	...	...	...	...	...	1	1	...	...	...	...	...	...	2	...	2	...	5	...
Northampton.....	Males.....	...	...	...	...	...	...	...	1	1	2	...	2	...	...	...	...	...	1	1	...	1	...	2	...	...	...	...	6	...
	Females.....	1	1	...	...	...	1	...	...	2	1	...	1	...	...	...	...	1	1	1	1	...	1	...	1	...	2	...	7	13
Northwood.....	Males.....	...	...	...	...	...	...	1	2	2	4	...	...	...	...	...	1	2	2	2	...	1	...	...	...	1	...	...	10	...
	Females.....	2	...	...	...	...	1	2	1	2	2	2	1	...	...	...	2	3	1	2	1	1	...	...	...	3	...	...	13	23
Nottingham.....	Males.....	...	1	1	...	...	...	1	2	2	1	...	...	...	...	...	1	...	1	...	1	...	2	...	...	...	...	...	8	...
	Females.....	...	...	...	...	...	1	1	1	1	2	...	1	...	...	...	1	1	1	...	...	1	...	1	...	2	...	...	6	14
Plaistow.....	Males.....	1	...	1	...	...	...	1	1	...	2	...	...	...	...	...	...	1	...	...	...	...	2	...	...	...	...	...	5	...
	Females.....	1	...	...	...	...	...	1	1	2	...	...	...	...	...	1	2	...	...	...	...	...	2	...	...	1	...	...	5	10
Portsmouth.....	Males.....	13	9	4	1	4	7	10	16	19	8	4	...	...	...	1	6	8	9	10	12	10	13	2	7	4	9	...	97	...
	Females.....	4	8	1	7	11	6	9	10	14	10	2	...	3	9	11	13	8	5	3	7	5	5	7	3	10	...	...	86	183
Raymond.....	Males.....	...	...	...	...	...	1	4	1	6	...	2	...	...	...	...	4	3	...	3	1	...	1	...	...	1	...	...	14	...
	Females.....	...	...	...	...	...	...	...	2	2	...	2	...	...	...	2	1	...	2	1	...	...	...	...	1	...	...	...	7	21
Rye.....	Males.....	2	...	...	...	...	1	...	...	2	3	...	...	...	...	...	1	1	1	1	...	1	...	...	...	1	...	...	8	...
	Females.....	2	...	...	...	...	...	...	2	2	...	...	...	...	...	2	1	...	2	1	...	...	...	1	...	1	...	...	6	14
Salem.....	Males.....	2	2	1	1	...	1	3	2	2	3	...	...	...	...	1	...	5	3	1	1	1	3	1	1	...	...	...	17	...
	Females.....	...	2	...	1	2	...	...	...	1	3	2	...	...	...	...	4	1	3	...	...	...	1	1	1	...	1	...	13	30
Sandown.....	Males.....	2	...	...	...	...	...	...	2	...	...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	1	...	...	4	...
	Females.....	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	2	6



Table No. 8.—1906.—Continued.

TOWNS IN STRAFFORD COUNTY. —Continued.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Middleton.....	Males.....	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
Milton.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13	23
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	6
New Durham.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	14
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rochester.....	Males.....	17	4	1	1	4	4	4	8	4	7	3	1	3	4	5	7	5	3	2	2	7	7	2	7	6	7	57	121
	Females.....	15	4	1	2	2	5	5	5	6	13	5	1	8	6	4	4	2	8	1	3	9	9	6	2	6	6	64	64
Rollinsford.....	Males.....	6	1	1	1	2	1	1	3	1	1	1	1	2	1	8	1	3	2	1	1	2	2	1	2	1	1	17	27
	Females.....	2	1	1	1	5	1	1	4	3	4	2	1	2	2	1	1	1	1	1	3	1	3	3	3	2	2	27	44
Somersworth.....	Males.....	23	4	2	2	5	3	6	8	2	1	1	1	1	6	5	8	5	3	5	5	4	4	5	2	5	5	57	114
	Females.....	13	6	4	3	1	6	5	2	6	5	5	1	9	4	8	4	4	4	4	2	3	8	7	4	4	4	57	57
Strafford.....	Males.....	1	1	1	1	1	1	1	2	2	4	1	2	1	1	1	1	1	1	2	4	1	1	1	1	1	1	11	21
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
Total.....	Males.....	71	17	2	10	18	19	31	34	53	20	4	11	30	28	36	23	23	23	19	22	30	23	21	24	28	307	307	671
	Females.....	49	18	9	14	20	34	26	46	66	34	8	7	31	38	35	38	38	20	19	17	32	41	37	25	31	364	364	671

TOWNS IN BELKNAP COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Alton.....	Males.....	3	...	...	...	...	1	...	2	2	3	5	...	...	...	1	1	2	1	...	1	1	...	4	1	3	1	...	16	31
	Females.....	2	...	...	...	...	...	2	1	2	4	3	1	...	...	...	...	1	1	3	...	...	2	1	1	3	1	...	15	
Barnstead.....	Males.....	2	...	1	1	...	...	...	1	1	2	2	...	...	...	3	1	...	...	2	1	...	1	1	...	...	1	...	10	23
	Females.....	...	...	...	...	...	...	...	1	5	6	...	...	...	...	1	1	2	4	...	...	...	1	3	...	1	...	...	13	
Belmont.....	Males.....	4	2	2	1	1	1	1	2	2	1	1	1	...	...	2	1	4	...	2	3	1	2	...	1	1	1	...	18	25
	Females.....	1	...	1	...	1	1	1	1	...	2	1	...	...	...	1	1	1	1	2	...	...	1	1	1	...	...	...	7	
Centre Harbor.....	Males.....	1	...	...	...	...	...	...	...	1	1	1	...	...	...	...	...	...	...	1	...	...	...	2	1	...	...	...	4	6
	Females.....	1	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	2	
Gilford.....	Males.....	1	...	...	...	...	...	1	...	3	1	2	...	...	...	1	...	...	3	...	...	1	...	...	1	2	...	...	8	12
	Females.....	...	...	...	...	...	...	...	1	2	...	1	...	...	...	...	1	...	...	...	...	...	1	...	1	1	...	...	4	
Gilmanton.....	Males.....	2	...	2	1	...	...	...	...	2	3	...	2	...	...	...	...	1	3	...	1	3	...	1	...	2	1	...	12	21
	Females.....	...	...	...	...	...	...	...	...	4	2	...	...	...	...	1	2	...	1	1	1	...	1	...	1	...	1	...	9	
Laconia.....	Males.....	16	6	2	6	4	7	4	13	12	18	7	2	...	...	11	5	13	8	11	4	9	9	6	7	9	5	...	97	195
	Females.....	18	2	1	2	3	7	11	9	13	16	9	6	1	...	8	7	12	9	12	6	6	17	3	9	6	3	...	98	
Meredith.....	Males.....	2	...	...	1	...	...	...	2	1	4	5	...	...	...	2	2	1	1	1	2	...	1	...	3	1	1	...	15	30
	Females.....	3	1	1	1	1	1	1	1	5	...	2	...	...	...	8	1	1	3	...	1	4	...	...	...	1	1	...	15	
New Hampton.....	Males.....	1	...	...	...	...	...	1	...	1	4	...	1	...	...	...	2	1	...	1	1	1	...	...	1	...	1	...	8	13
	Females.....	1	...	1	...	...	...	...	...	...	1	1	...	...	...	1	...	...	1	...	...	...	...	...	1	...	2	...	5	
Sanbornton.....	Males.....	...	...	...	...	...	...	...	1	2	...	2	...	...	...	...	...	1	...	...	1	...	...	1	1	1	...	...	5	9
	Females.....	1	...	...	...	...	...	...	1	...	...	2	...	...	...	1	...	2	1	...	...	...	...	...	...	...	...	...	4	
Tilton.....	Males.....	1	...	...	1	1	...	...	2	9	7	1	...	...	...	3	2	4	...	1	3	1	6	1	...	...	1	...	22	42
	Females.....	4	...	1	...	...	...	3	5	2	4	1	...	...	...	2	1	3	1	4	2	...	2	2	...	1	2	...	20	
Total.....	Males.....	31	10	4	8	6	13	8	23	36	44	26	6	...	...	28	14	26	17	19	17	17	19	16	16	19	12	...	215	407
	Females.....	...	5	2	5	6	8	15	19	36	33	23	8	1	...	17	13	21	23	24	10	11	24	12	13	13	11	...	192	

Table No. 8.—1906.—Continued.

TOWNS IN CARROLL COUNTY.		Under 1.															Grand total.											
		1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.
Albany	Males.....	1																						1				1
	Females.....	1							1						1											1		2
Bartlett.	Males.....																											
	Females.....	1	2	1	2		1	1		1					1				1			2		3	1			4
Brookfield.	Males.....																											
	Females.....	1								1						1										1		2
Chatham	Males.....																											
	Females.....	1													1													1
Conway	Males.....	6	1	1	2	3	3	5	4	1	1					2	3	5	3	4	2	2	3	2	1	2		29
	Females.....	3	1	2	1	1	5	9	8	3	3				3	1	2	2	5	2	4	2	3		2	3	29	
Eaton.	Males.....																1											1
	Females.....	1													1												1	2
Effingham.	Males.....	1																		1				1				6
	Females.....						1	1		2	1				1	3			2			1		1			5	
Freedom.	Males.....																											
	Females.....	1	1					2		1							1			1			2		1		2	6
Hart's Location	Males.....																											
	Females.....																								1		1	1
Jackson	Males.....	1														1	1			1								6
	Females.....								1	1	2						1	1	1	1			1	1			3	9

[illegible]TOWNS IN  
MERRIMACK COUNTY.

TOWNS IN MERRIMACK COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.
Allenstown....	Males.....	8	2	1	1	1	1	1	...	1	1	1	...	...	...	1	...	2	1	1	1	...	3	4	1	1	1	...	16
	Females....	5	2	...	...	...	...	1	4	1	3	1	...	...	...	1	2	2	...	1	1	...	1	1	4	2	1	...	16
Andover.....	Males.....	2	3	1	...	1	1	1	1	1	1	1	...	...	...	...	1	1	1	...	2	1	2	1	...	1	...	...	9
	Females....	1	...	1	...	...	...	2	...	2	3	3	...	...	...	2	1	5	...	...	2	...	1	1	...	2	...	...	13
Grand total.		13	5	2	2	2	2	2	1	2	2	2	2	2	2	2	2	3	2	2	2	2	4	5	2	2	2	2	32



Table No. 8.—1906.—Continued.

TOWNS IN MERRIMACK COUNTY. —Continued.		Grand total.																											
		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.
Boscawen.....	Males.....	1	1	1	1	1	3	3	4	11	7	1	5	2	2	4	2	2	2	2	2	...	...	3	5	6	2	...	33
	Females.....	...	...	...	2	3	2	2	2	4	...	3	1	2	1	4	1	...	1	...	1	1	3	1	2	...	1	...	17
Bow.....	Males.....	1	...	1	1	...	1	1	...	2	1	...	...	...	1	...	...	1	...	2	1	...	...	1	2	...	...	7	
	Females.....	...	...	...	...	...	...	...	...	3	2	...	...	2	...	...	...	...	...	1	...	...	...	1	...	1	...	5	
Bradford.....	Males.....	...	...	...	...	...	...	1	...	3	2	...	...	...	...	2	1	...	...	...	...	...	...	1	1	1	...	6	
	Females.....	...	...	...	...	...	2	2	2	6	...	...	1	1	2	2	1	2	2	1	1	1	1	1	1	1	...	12	
Canterbury....	Males.....	1	...	1	1	...	1	...	2	...	...	1	...	...	1	1	1	1	1	1	...	...	1	...	2	...	5		
	Females.....	1	...	2	...	...	...	...	...	2	1	...	1	1	1	1	...	...	...	1	...	...	1	...	...	...	6		
Chichester....	Males.....	...	...	1	...	...	...	1	1	2	...	1	...	1	...	...	...	...	...	1	...	1	...	...	...	2	...	4	
	Females.....	...	...	...	1	...	1	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	1	...	...	...	4		
Concord.....	Males.....	32	5	8	10	22	23	21	34	31	15	3	14	8	19	16	14	12	15	27	23	21	14	26	...	209			
	Females.....	23	5	2	4	10	24	16	22	27	29	3	21	19	21	11	20	11	11	14	18	12	13	17	...	188			
Danbury.....	Males.....	1	...	1	...	...	...	...	...	1	2	...	...	...	1	...	1	1	1	1	1	...	1	...	...	...	5		
	Females.....	...	...	1	...	...	...	...	2	1	1	...	...	...	...	1	1	1	...	...	...	...	1	...	2	...	5		
Dunbarton....	Males.....	1	...	...	...	...	...	...	...	...	2	...	...	...	1	1	1	1	...	...	...	...	1	...	...	...	3		
	Females.....	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	2	...	...	4		
Epsom.....	Males.....	1	1	...	...	...	...	...	2	3	...	...	...	2	1	...	...	...	1	...	1	...	...	2	...	1	...	7	
	Females.....	...	...	1	1	1	1	1	...	4	3	...	...	1	2	2	...	1	...	1	...	1	...	1	3	...	11		
Franklin.....	Males.....	15	7	1	2	3	8	1	3	4	6	5	1	3	6	2	3	5	3	9	7	3	8	4	8	...	51		
	Females.....	6	4	1	2	3	1	...	6	4	4	2	1	1	4	1	4	6	4	5	2	...	2	2	1	...	35		
Henniker.....	Males.....	1	...	1	1	...	1	3	1	3	2	1	...	4	1	1	2	...	2	2	...	...	1	...	...	...	10		
	Females.....	1	...	1	1	1	...	1	1	3	1	1	...	1	1	1	1	1	2	2	...	...	1	...	2	1	...	20	



## REGISTRATION REPORT.

Table No. 8.—1906.—Continued.

TOWNS IN HILLSBOROUGH COUNTY.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
		1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Unknown.															
Amherst.....Males.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	22
Females.....	2	1	1	1	1	1	1	2	2	7	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	15	22
Antrim.....Males.....	1	1	2	1	1	1	1	1	1	2	1	1	2	2	1	1	3	5	1	1	2	1	1	1	1	1	12	20
Females.....	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	8	20
Bedford.....Males.....	2	2	1	2	1	1	1	1	1	3	2	1	1	1	2	1	3	1	1	1	2	1	1	1	1	1	13	24
Females.....	1	1	1	1	1	1	1	1	4	1	1	2	1	1	1	2	3	1	1	1	1	1	1	1	2	1	11	24
Bennington.....Males.....	1	1	1	1	1	1	1	1	3	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	7	11
Females.....	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	11
Brookline.....Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	8
Females.....	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	8
Deering.....Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	6
Females.....	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	4	6
Francestown.....Males.....	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	5	9
Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	4	9
Goffstown.....Males.....	5	2	2	4	9	8	4	5	6	5	6	1	1	5	7	3	5	6	2	2	4	5	2	2	4	3	48	85
Females.....	1	1	1	2	5	8	7	7	7	7	7	1	1	2	2	5	5	3	2	3	2	2	2	4	3	4	37	85
Greenfield.....Males.....	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	5	10
Females.....	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	10
Greenville.....Males.....	3	2	1	1	1	1	1	2	1	1	1	1	1	8	2	1	1	1	1	1	2	1	1	1	1	1	12	28
Females.....	6	1	2	3	2	1	1	1	1	1	1	1	1	3	2	1	1	2	1	2	2	1	1	1	1	1	16	28

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## REGISTRATION REPORT.

Table No. 8.—1906.—Continued.

TOWNS IN HILLSBOROUGH COUNTY. —Continued.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
		1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Pelham.....Males.....	2	..	..	..	..	..	1	..	1	1	1	..	..	2	..	..	..	..	..	2	1	..	..	1	..	..	6	11
Females.....	..	..	..	..	..	..	..	..	2	1	2	..	..	2	..	..	..	..	1	..	..	..	1	..	..	..	5	..
Peterborough.....Males.....	2	2	..	1	2	1	1	2	3	3	2	..	..	3	1	1	1	3	..	1	1	4	1	1	1	..	18	36
Females.....	..	..	..	1	1	1	1	3	5	3	2	1	..	3	2	4	2	1	..	1	1	2	..	1	1	..	18	..
Sharon.....Males.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Females.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Temple.....Males.....	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	2	3
Females.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Weare.....Males.....	3	..	1	1	..	1	..	1	3	5	3	..	..	1	2	1	1	3	3	1	..	1	1	1	1	..	16	..
Females.....	1	..	2	..	2	..	2	3	2	1	3	1	..	..	1	1	2	1	1	3	3	2	1	1	2	..	15	31
Wilton.....Males.....	1	1	1	..	..	..	1	..	3	5	1	1	..	1	2	..	1	3	..	..	1	1	2	1	1	..	13	..
Females.....	2	..	..	..	..	1	..	1	3	5	2	..	..	1	1	1	..	1	1	1	1	8	..	2	2	..	14	27
Windsor.....Males.....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1
Females.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....Males.....	313	98	29	48	59	81	77	94	119	134	81	12	..	5	76	103	90	92	88	101	110	94	87	95	107	..	1150	..
Females.....	244	89	28	53	70	80	87	93	155	149	88	13	..	4	92	117	99	99	88	85	108	98	87	79	102	1	1153	2303

TOWNS IN  
CHESHIRE COUNTY.[illegible]









[illegible]

Table No. 8.—1906.—Continued.

TOWNS IN GRAFTON COUNTY. —Continued.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Hanover.....Males.....	3	2	1	1	6	..	5	2	4	3	1	...	...	...	2	2	3	2	1	3	5	4	1	3	1	2	...	29	50
Females.....	..	..	..	..	..	..	..	2	4	1	3	...	...	...	1	1	6	3	1	1	1	1	4	1	1	...	...	21	
Haverhill.....Males.....	9	1	2	4	2	..	1	4	5	7	3	...	...	...	3	3	3	4	3	4	4	4	3	2	2	3	...	41	
Females.....	5	3	1	1	6	3	4	9	6	6	5	2	...	...	6	4	4	7	4	2	4	2	6	6	1	5	...	51	92
Hebron.....Males.....	..	..	..	..	..	..	..	..	..	..	2	...	...	...	..	..	..	..	..	..	1	...	...	...	1	...	...	2	2
Females.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	...	
Holderness...Males.....	..	..	1	1	..	..	..	..	1	..	1	...	...	...	1	1	..	..	..	..	2	..	..	..	..	..	...	4	
Females.....	..	..	3	1	..	2	..	2	..	1	3	...	...	...	..	1	1	..	..	..	1	8	1	3	..	..	...	10	14
Landaff.....Males.....	2	..	1	..	..	..	3	..	1	..	1	...	...	...	..	2	..	..	..	1	..	1	1	2	..	..	...	7	9
Females.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	2	
Lebanon.....Males.....	7	2	..	4	5	2	3	5	7	4	..	...	...	...	4	2	4	3	4	2	3	4	6	1	2	4	...	39	
Females.....	5	..	1	2	4	1	3	5	8	11	4	1	...	...	3	3	5	5	3	2	4	7	2	2	5	4	...	45	84
Lincoln.....Males.....	3	1	..	..	..	..	..	..	..	1	..	...	...	...	..	..	..	..	..	..	2	..	2	..	..	1	...	5	8
Females.....	2	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	1	..	..	...	3	
Lisbon.....Males.....	2	1	..	1	2	..	1	2	5	5	1	...	...	...	3	8	1	1	8	..	3	..	2	1	2	1	...	20	
Females.....	4	2	1	..	1	1	..	1	1	3	2	...	...	...	2	..	1	2	3	1	3	3	1	..	..	..	...	16	36
Littleton.....Males.....	6	3	1	..	1	2	1	3	6	3	3	2	...	...	1	4	2	1	1	..	3	5	2	3	5	4	...	31	
Females.....	6	6	..	4	3	2	6	9	8	1	..	...	...	...	5	6	1	2	2	1	8	10	9	5	4	1	...	49	80
Livermore.....Males.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	...	
Females.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	...	
Lyman.....Males.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	...	
Females.....	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	...	2	2

[illegible]



## REGISTRATION REPORT.

Table No. 8.—1906.—Continued.

TOWNS IN COOS COUNTY.		Under 1.												90 to 100.	Over 100.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Berlin	Males.....	41	8	2	7	8	5	6	1	6	2	2	..	..	6	6	18	8	12	..	..	7	9	14	7	4	2	..	88	186
	Females.....	41	16	5	2	7	9	5	3	3	5	1	..	1	..	6	5	7	10	14	7	5	16	11	6	8	3	..	98	
Carroll	Males.....	..	..	..	..	2	1	..	..	1	1	1	..	..	..	1	..	..	..	..	1	1	1	..	2	..	..	..	6	11
	Females.....	1	1	..	..	1	..	1	1	1	..	..	..	..	..	1	..	..	..	..	..	2	1	..	1	..	..	..	5	
Clarksville.	Males.....	1	..	1	1	..	1	1	1	1	1	1	..	..	1	1	1	2	1	..	..	..	..	..	1	..	..	6	7	
	Females.....	..	..	..	..	..	..	..	..	1	1	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	1		
Colebrook.....	Males.....	1	1	..	1	..	2	1	1	..	2	2	1	..	2	1	2	2	1	1	1	1	1	3	..	..	..	10	21	
	Females.....	2	..	..	1	..	..	..	4	2	2	..	..	..	1	2	2	2	1	1	1	..	..	..	1	..	..	11		
Columbia.....	Males.....	2	..	..	..	..	2	1	..	2	1	1	..	..	..	2	1	..	1	1	1	1	..	..	1	1	2	7	13	
	Females.....	1	1	1	1	..	..	..	1	..	1	..	..	..	1	..	..	..	1	1	1	..	..	..	1	2	..	6		
Dalton.....	Males.....	1	..	..	..	1	1	..	..	1	..	1	..	..	..	..	..	..	1	..	1	1	1	..	..	2	..	2	5	
	Females.....	2	..	..	..	..	..	1	1	1	1	..	..	..	..	..	..	..	..	..	1	..	1	1	..	2	..	3		
Dummer.....	Males.....	1	..	..	1	..	..	..	2	..	..	..	..	..	1	1	..	1	1	..	..	..	..	1	1	..	..	3	4	
	Females.....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	..	1	1	..	..	1			
Errol.....	Males.....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	..	1	3	
	Females.....	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	1	1	..	..	..	1	1	..	..	2			
Gorham.....	Males.....	3	4	1	1	2	1	4	2	4	2	4	..	..	2	..	2	4	1	1	2	1	4	1	4	1	..	22	38	
	Females.....	4	2	..	..	3	1	..	3	2	1	1	..	1	1	2	1	1	1	1	1	1	4	1	3	..	16			

[illegible]

Table  
Recapitulation, Deaths by Ages, Sex,

COUNTIES.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.
Rockingham.....	Males.....	62	22	11	14	11	21	31	46	78	93	55
	Females.....	43	21	5	8	26	36	27	38	58	81	50
	Not stated.....											
Strafford.....	Males.....	71	17	2	10	18	19	17	31	34	53	20
	Females.....	49	18	9	14	20	34	33	26	46	66	34
	Not stated.....											
Belknap.....	Males.....	31	10	4	8	6	13	8	23	36	44	26
	Females.....	31	5	2	5	6	8	15	19	36	33	23
	Not stated.....											
Carroll.....	Males.....	17	8		3	3	9	12	16	26	25	17
	Females.....	15	8		6	6	7	10	8	20	27	19
	Not stated.....											
Merrimack.....	Males.....	85	28	9	21	20	32	38	40	70	90	56
	Females.....	62	19	10	14	30	44	30	56	66	83	66
	Not stated.....											
Hillsborough.....	Males.....	313	98	29	48	59	81	77	94	119	134	81
	Females.....	244	89	28	53	70	80	87	93	155	149	88
	Not stated.....											
Cheshire.....	Males.....	48	14	6	4	13	10	23	18	24	52	33
	Females.....	30	11	4	6	11	18	13	14	38	46	37
	Not stated.....											
Sullivan.....	Males.....	25	7	3	1	3	9	7	12	21	35	20
	Females.....	16	5		9	7	7	9	10	25	22	27
	Not stated.....											
Grafton.....	Males.....	56	17	7	16	26	15	20	30	54	66	39
	Females.....	58	18	7	11	30	34	25	31	59	54	49
	Not stated.....											
Coös.....	Males.....	64	16	4	12	15	17	19	17	28	27	17
	Females.....	59	26	6	8	17	17	8	12	19	18	13
	Not stated.....											
Total.....	Males.....	772	237	75	137	174	226	252	327	490	619	364
	Females.....	607	220	71	134	223	285	257	307	522	579	406
	Not stated.....											
Grand total.....		1379	457	146	271	397	511	509	634	1012	1198	770

No. 8.—*Concluded.*

and Months, by Counties, 1906.\*

90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
14 ....		5	33	33	39	38	46	37	41	39	39	37	35	46	....	463	878
17 ....		5	29	41	57	40	34	32	22	32	30	37	21	40	....	415	
....																	
4 ....		11	30	28	36	23	23	19	22	30	23	21	24	28	....	307	671
8 ....		7	31	38	35	38	20	19	17	32	41	37	25	31	....	364	
....																	
6 ....			23	14	26	17	19	17	17	19	16	16	19	12	....	215	407
8 ....	1		17	13	21	23	24	10	11	24	12	13	13	11	....	192	
....																	
1 ....			8	11	13	5	11	10	8	16	9	24	14	8	....	137	269
4 ....		2	13	11	9	6	14	11	8	12	18	9	9	12	....	132	
....																	
12 ....		1	36	28	47	38	34	39	38	55	46	46	42	53	....	502	997
13 ....		2	49	49	57	36	43	38	32	37	31	43	34	46	....	495	
....																	
12 ....		5	107	76	103	90	92	88	101	110	94	87	95	107	....	1150	2303
13 ....		4	98	92	117	99	99	88	85	108	98	87	79	102	1	1153	
....																	
7 ....		2	21	12	21	26	24	21	13	19	22	25	26	24	....	254	495
12 ....			20	24	18	20	29	20	16	16	22	17	19	19	....	240	
....		1													1	1	
2 ....		2	10	13	8	20	16	11	9	10	12	19	10	9	....	147	289
5 ....			11	13	14	15	13	8	14	17	9	10	12	6	....	142	
....																	
3 ....		6	35	21	34	27	30	18	35	33	37	25	27	33	....	355	744
10 ....		3	36	34	36	37	30	20	33	37	39	38	20	29	....	389	
....																	
2 ....		1	21	20	32	21	24	8	17	28	21	15	17	15	....	239	445
2 ....		1	18	13	19	21	20	10	14	22	20	16	20	13	....	206	
....																	
63 ....		33	324	256	359	305	319	268	301	359	319	315	309	335	....	3769	7498
92 1		24	322	328	383	335	326	256	252	337	320	307	252	309	1	3728	
....		1	....	....	....	....	....	....	....	....	....	....	....	....	1	1	
155 1		58	646	584	742	640	645	524	553	696	639	622	561	644	2	7498	7498

\* Not including stillbirths.









III. DISEASES OF THE CIRCULATORY SYSTEM.									
M.	1	1	1	1	1	1	1	1	1
M.	1	1	1	1	1	1	1	1	1
F.	3	2	5	2	6	4	8	5	2
M.	3	4	1	1	1	1	1	1	1
F.	2	1	1	1	1	1	1	1	1
M.	1	3	1	3	1	2	4	7	1
F.	3	4	2	1	3	1	1	1	1
M.	34	30	34	24	28	29	29	35	32
F.	24	28	37	25	28	28	17	27	35
M.	2	2	1	3	3	4	4	2	2
F.	3	1	2	4	2	1	1	9	3
M.	5	1	2	1	1	2	3	4	1
F.	1	1	2	1	1	1	3	2	1
M.	3	2	1	1	1	1	3	6	1
F.	4	1	2	3	6	1	1	3	1
M.	1	3	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	1	1	2	1	1	2	1	1	1
F.	1	1	1	1	1	1	1	1	1
IV. DISEASES OF THE RESPIRATORY SYSTEM.									
M.	1	1	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	2	1	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	7	10	6	2	1	3	1	3	6
F.	10	11	15	10	4	4	3	5	3
M.	2	1	2	2	2	1	2	2	2
F.	1	2	4	1	2	1	2	1	2
M.	3	5	12	9	3	3	1	3	5
F.	3	1	9	8	1	1	2	1	5
M.	28	35	40	32	13	6	4	3	15
F.	45	37	47	26	18	7	3	14	19
M.	1	1	2	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	1	1	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	2	6	5	3	1	1	2	3	2
F.	4	3	3	3	6	1	3	4	6
M.	1	1	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	1	1	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
V. DISEASES OF THE NERVOUS SYSTEM.									
M.	63	23	40	3	1	1	1	1	1
F.	3	1	1	1	1	1	1	1	1
M.	23	16	7	2	1	1	1	1	1
F.	48	27	21	1	1	1	1	1	1
M.	681	353	328	9	2	3	3	10	17
F.	24	28	37	25	28	28	17	27	35
M.	2	2	1	3	4	2	2	1	3
F.	3	1	2	4	2	1	1	9	3
M.	5	1	2	1	1	2	3	4	1
F.	1	1	2	1	1	1	3	2	1
M.	3	2	1	1	1	1	3	6	1
F.	4	1	2	3	6	1	1	3	1
M.	1	3	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
M.	1	1	1	1	1	1	1	1	1
F.	1	1	1	1	1	1	1	1	1
VI. DISEASES OF THE RESPIRATORY SYSTEM.									
M.	11	6	5	1	3	1	1	1	1
F.	12	7	5	2	4	1	1	1	1
M.	2	2	2	1	2	1	1	1	1
F.	133	55	78	24	6	1	1	1	1
M.	24	12	1	1	1	1	1	1	1
F.	33	16	17	1	1	1	1	1	1
M.	96	55	41	19	20	1	1	1	1
F.	525	248	277	29	28	3	2	6	16
M.	34	18	6	5	4	9	19	27	46
F.	19	10	9	1	1	1	1	1	1
M.	60	27	33	9	1	1	1	1	1
F.	3	1	1	1	1	1	1	1	1
M.	14	1	7	7	7	7	7	7	7
F.	14	1	7	7	7	7	7	7	7

Table No. 9.—1906.—Continued.

MONTHS.												WHOLE NUMBER.		AGES.											Unknown.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.			Unknown.	Totals.	Males.	Females.	Unknown.	Under 1.	1 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.		30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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V. DISEASES OF THE DIGESTIVE SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
M.	98.	Pulmonary emphysema.....																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

[illegible]



M..	8	2	5	3	5	8	6	8	5	10	7	8	166. Other accidental traumatisms.....	91	75	16	1	1	3	9	12	13	8	8	4	9	3	5	
F..	1	3	1	1	1	2	1	2	2	1	2	3	Other accidental traumatisms.....	25	8	17	1	1	2	1	1	1	1	1	2	2	3	1	
M..	1	1	1	1	1	1	1	1	1	1	1	3	Burns and scalds.....	6	6	9	1	6	2	1	1	1	1	1	1	1	2	1	
F..	3	2	1	3	1	3	2	1	1	2	2	4	Burns and scalds.....	54	45	9	1	6	2	1	1	1	1	1	1	1	2	1	
M..	1	4	1	1	1	4	1	1	1	1	1	1	Electric shock.....	10	5	5	1	2	1	1	1	1	1	1	2	1	1	1	
F..	1	1	1	1	1	1	1	1	1	1	1	1	Accidental drowning.....	30	16	14	1	2	1	1	1	1	1	1	1	1	1	1	
M..	1	1	1	1	1	1	1	1	1	1	1	1	Accidental drowning.....	35	21	14	13	2	1	1	1	1	1	1	1	1	1	1	
F..	1	1	1	1	1	1	1	1	1	1	1	1	Accidental drowning.....	7	2	1	7	2	1	1	1	1	1	1	1	1	1	1	
M..	1	1	1	1	1	1	1	1	1	1	1	1	Absorption of deleterious gases (non-sul- phuric).....	10	5	5	1	2	1	1	1	1	1	1	1	1	1	1	
F..	1	1	1	1	1	1	1	1	1	1	1	1	Absorption of deleterious gases (non-sul- phuric).....	30	16	14	1	2	1	1	1	1	1	1	1	1	1	1	
M..	1	1	1	1	1	1	1	1	1	1	1	1	Other acute poisonings.....	35	21	14	13	2	1	1	1	1	1	1	1	1	1	1	
F..	1	1	1	1	1	1	1	1	1	1	1	1	Other acute poisonings.....	7	2	1	7	2	1	1	1	1	1	1	1	1	1	1	
M..	8	3	3	1	1	2	2	1	1	1	2	1	Other external violence.....	17	5	12	1	1	1	1	1	1	1	1	1	1	1	1	
F..	5	2	1	1	1	2	1	1	1	1	3	1	Other external violence.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
XIV. ILL-DEFINED DISEASES.																													
M..	1	1	1	1	1	1	1	1	1	1	1	177. Dropsy.....	17	5	12	1	1	1	1	1	1	1	1	1	1	1	1	1	
F..	2	1	1	1	1	2	2	1	1	1	1	177. Dropsy.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
M..	7	4	8	2	4	1	9	4	7	9	6	1	178. Sudden death.....	138	62	75	1	1	1	1	1	1	1	1	1	1	1	1	1
F..	4	5	9	8	8	5	7	3	8	11	4	3	Causes of death unspecified or ill-defined.....	26	34	1	26	3	4	1	1	1	1	1	1	1	1	1	1
													Causes of death unspecified or ill-defined.....																

\* Classed with males.





TABLES OF BIRTHS, MARRIAGES,  
DIVORCES, AND DEATHS,  
1907.

Table

Births, Marriages, and Deaths for  
Rockingham

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Atkinson.....	442	5	1	..	6	13.56	5	1	..	..	..
Auburn.....	682	5	5	..	10	14.66	8	2	..	..	..
Brentwood.....	957	3	6	..	9	9.40	8	..	..	1	..
Candia.....	1,057	10	7	..	17	16.08	14	2	1	..	..
Chester.....	861	4	6	..	10	11.61	6	1	1	2	..
Danville.....	615	2	2	..	4	6.50	4	..	..	..	..
Deerfield.....	1,162	6	6	..	12	10.32	8	4	..	..	..
Derry.....	3,583	38	49	..	87	24.28	39	25	11	11	1
East Kingston.....	496	3	..	..	3	6.05	2	..	1	..	..
Epping.....	1,641	25	17	1	43	26.20	17	21	2	2	1
Exeter.....	4,922	52	50	1	103	20.92	42	36	10	12	3
Fremont.....	749	16	10	..	26	34.71	15	6	4	..	1
Greenland.....	607	6	5	..	11	18.12	4	..	2	2	3
Hampstead.....	823	3	4	..	7	8.50	4	1	..	1	1
Hampton.....	1,209	8	16	..	24	19.84	21	1	1	1	..
Hampton Falls.....	560	6	5	..	11	19.64	11	..	..	..	..
Kensington.....	524	2	8	..	10	19.08	9	..	..	1	..
Kingston.....	1,132	14	6	..	20	17.66	17	1	2	..	..
Londonderry.....	1,408	16	9	..	25	17.75	19	2	1	2	1
Newcastle.....	581	2	4	..	6	10.32	4	..	..	2	..
Newfields.....	647	1	1	..	2	3.09	1	1	..	..	..
Newington.....	390	1	..	..	1	2.56	..	..	..	1	..
Newmarket.....	2,892	50	48	..	98	33.88	17	63	7	6	5
Newton.....	924	6	6	..	12	12.98	9	2	1	..	..
North Hampton.....	812	6	7	..	13	16.01	9	..	3	1	..
Northwood.....	1,304	5	6	..	11	8.43	10	..	..	1	..
Nottingham.....	638	6	5	..	11	17.24	11	..	..	..	..
Plaistow.....	1,027	7	9	..	16	15.57	9	5	2	..	..
Portsmouth.....	10,637	123	136	3	262	24.63	131	86	19	23	3
Raymond.....	1,100	16	6	..	22	20.00	13	2	2	5	..
Rye.....	1,142	10	6	..	16	14.01	5	1	3	7	..
Salem.....	2,041	13	13	..	26	12.73	13	7	3	2	1
Sandown.....	400	5	5	..	10	25.00	9	1	..	..	..
Seabrook.....	1,497	17	27	..	44	29.39	38	1	1	2	2
South Hampton.....	297	..	..	..	..	..	..	..	..	..	..
Stratham.....	718	6	2	..	8	11.14	7	..	..	1	..
Widham.....	641	5	4	..	9	14.04	7	1	1	..	..
Total.....	51,118	503	497	5	1,005	19.66	546	273	78	86	22

No. 10.

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
2	.....	.....	1	.....	3	4	5	.....	9	8	1	...	20.34
8	.....	.....	1	.....	9	9	9	.....	18	12	4	2	26.38
12	.....	1	.....	.....	13	25	12	.....	*37	28	8	1	38.66
4	.....	1	1	.....	6	9	11	.....	20	17	3	.....	18.92
4	.....	.....	.....	.....	4	14	7	.....	21	19	1	1	24.39
9	.....	.....	.....	.....	4	5	5	.....	10	9	1	.....	16.26
39	7	4	2	.....	52	10	12	15	27	25	.....	2	23.23
3	.....	1	2	.....	6	33	33	.....	66	48	12	6	18.42
4	.....	1	.....	.....	6	2	5	.....	7	5	2	.....	14.11
32	1	.....	1	.....	6	11	11	.....	22	20	1	1	13.40
3	16	3	9	.....	60	41	37	.....	78	61	14	3	15.84
3	.....	.....	.....	.....	4	4	9	.....	13	13	.....	.....	17.35
1	.....	.....	.....	.....	1	5	9	.....	14	10	2	2	23.06
3	.....	.....	.....	.....	3	16	7	.....	23	21	2	.....	27.94
9	.....	1	1	.....	11	8	9	.....	17	13	3	1	14.06
2	.....	.....	.....	.....	2	3	4	.....	7	7	.....	.....	12.50
3	.....	.....	.....	.....	3	3	3	.....	6	4	1	1	11.45
15	.....	.....	.....	.....	15	4	12	.....	16	14	1	1	14.13
4	.....	1	.....	.....	5	21	8	.....	29	23	5	1	20.59
2	.....	1	.....	1	4	4	2	.....	5	4	.....	1	8.60
4	.....	.....	.....	.....	4	5	7	.....	12	10	1	1	18.54
2	.....	.....	.....	.....	2	2	4	.....	6	5	1	.....	15.38
6	10	2	2	.....	20	32	29	.....	61	47	11	3	21.09
14	.....	.....	1	.....	15	7	8	.....	15	12	2	1	16.23
7	.....	.....	.....	.....	7	5	1	.....	6	4	.....	2	7.38
5	.....	2	2	.....	9	9	10	.....	19	18	.....	1	14.57
5	.....	.....	.....	.....	5	6	2	.....	8	7	1	.....	12.53
10	.....	1	1	.....	12	11	12	.....	23	17	4	2	22.39
171	18	22	18	.....	229	103	93	.....	†196	143	44	9	18.42
7	1	1	.....	.....	19	14	7	.....	21	20	.....	1	19.09
17	.....	.....	.....	.....	7	14	8	.....	22	17	3	2	19.26
17	2	6	4	.....	29	19	15	.....	34	30	4	.....	16.65
1	.....	.....	2	.....	3	.....	4	.....	4	3	.....	1	10.00
13	.....	2	.....	.....	15	16	14	.....	30	29	.....	1	20.04
1	.....	.....	.....	.....	1	1	4	.....	5	5	.....	.....	16.83
6	.....	.....	.....	.....	6	3	4	.....	7	6	.....	1	9.74
4	.....	.....	.....	.....	4	9	9	.....	18	15	3	.....	28.08
449	55	51	48	1	604	487	445	.....	932	749	135	48	18.23

\* Died at county farm, 25.

† Died at public institutions, 10.

Table  
Births, Marriages and Deaths for  
Strafford

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Barrington .....	1,208	7	4	..	11	9.10	10	....	....	....	1
Dover.....	13,207	143	122	..	265	20.06	95	117	29	22	2
Durham.....	996	5	8	..	13	13.05	6	2	1	4	..
Farmington .....	2,265	13	19	..	32	14.12	27	1	2	2	..
Lee.....	545	6	4	..	10	10.34	10	....	....	....	..
Madbury.....	336	2	2	..	4	11.90	2	2	....	....	..
Middleton.....	300	3	3	..	6	20.00	5	....	....	....	1
Milton.....	1,625	23	17	..	40	24.61	25	6	4	5	..
New Durham.....	625	6	1	..	7	11.20	6	....	....	1	..
Rochester.....	8,466	105	100	..	205	24.21	101	68	17	15	4
Rollinsford.....	1,701	30	10	..	40	23.51	8	25	3	3	1
Somersworth.....	7,023	114	86	..	200	28.47	26	157	10	4	3
Strafford.....	1,040	7	2	..	9	8.65	7	....	2	....	..
Total.....	39,337	464	378	..	842	21.40	328	378	68	56	12

No. 10.—*Continued.*

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
6	1	.....	.....	.....	7	9	7	....	16	13	1	2	13.24
160	27	21	15	2	225	123	141	....	*264	184	56	24	19.98
2	.....	.....	2	....	4	5	3	....	8	6	.....	2	8.03
21	.....	.....	.....	.....	21	24	15	....	39	36	2	1	17.21
4	.....	.....	.....	.....	4	4	5	....	9	9	.....	.....	16.51
2	.....	.....	.....	.....	2	4	1	....	5	5	.....	.....	14.88
.....	.....	.....	.....	.....	.....	7	4	....	11	10	1	....	36.66
15	.....	1	3	....	19	19	15	....	34	33	1	....	20.92
1	.....	.....	.....	.....	1	4	5	....	9	8	1	....	14.40
85	13	13	14	1	126	50	67	....	117	86	22	9	13.82
6	4	1	3	....	14	20	18	....	38	28	9	1	22.33
22	32	8	7	1	70	57	47	....	104	60	34	10	14.80
6	.....	.....	.....	.....	6	9	8	....	12	12	.....	.....	11.53
330	77	44	44	4	499	335	331	....	666	490	127	49	16.93

\* Died at county farm, 11.

\* Died at public institutions, 16.



Table  
Births, Marriages, and Deaths for  
Belknap

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Alton .....	1,500	12	5	..	17	11.33	15	....	1	1	..
Barnstead .....	1,072	10	12	..	22	20.52	16	1	3	2	..
Belmont .....	1,294	17	11	..	28	21.63	15	8	2	2	1
Center Harbor .....	422	3	4	..	7	16.58	5	1	..	1	..
Gilford .....	661	4	7	..	11	16.64	10	....	....	....	1
Gilmanton .....	1,100	6	10	..	16	14.54	12	....	1	1	2
Laconia .....	8,042	123	109	1	*233	28.97	91	79	26	30	7
Meredith .....	1,713	14	5	..	19	11.09	16	....	2	1	..
New Hampton .....	852	6	5	..	11	12.91	9	....	1	....	1
Sanbornton .....	944	8	7	..	15	15.89	14	....	1	....	..
Tilton .....	1,926	16	22	..	38	19.73	23	10	3	2	..
Total .....	19,526	219	197	1	417	21.35	226	99	40	40	12

\* Born at county farm, 1.

No. 10.—*Continued.*

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
10	.....	2	.....	.....	12	2	7	....	9	9	.....	.....	6.00
3	.....	2	.....	.....	5	16	6	....	22	20	2	....	20.52
5	.....	1	2	....	8	7	6	....	13	11	2	....	10.04
1	1	.....	.....	.....	2	3	1	....	4	2	.....	2	9.47
4	.....	2	.....	.....	6	9	8	....	17	15	.....	2	25.71
6	.....	1	.....	.....	7	6	10	....	16	11	2	3	14.54
54	13	10	13	....	90	83	81	....	†164	130	27	7	20.39
10	.....	5	1	....	16	17	23	....	40	34	2	4	23.35
5	.....	.....	.....	.....	5	11	4	....	15	14	1	....	17.60
5	.....	.....	.....	.....	5	5	9	....	14	14	...	....	14.83
27	2	3	1	....	33	24	20	....	*44	37	4	3	22.84
130	16	26	17	...	189	183	175	....	358	297	40	21	18.33

† Died at county farm, 10; at public institutions, 10.

\* Died at public institution, 10.

Table  
Births, Marriages, and Deaths for  
Carroll

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Albany .....	210	2	1	..	3	14.28	1	2	....	....	..
Bartlett.....	1,013	12	6	..	18	17.76	10	2	2	3	1
Brookfield.....	296	1	2	..	3	10.13	2	....	....	1	..
Chatham.....	269	1	.....	..	1	3.71	1	....	....	....	..
Conway.....	3,154	39	18	..	57	18.07	37	7	7	6	..
Eaton.....	365	3	4	..	7	19.17	7	....	....	....	..
Effingham... .	600	3	10	..	13	21.67	9	1	....	1	2
Freedom.....	594	3	4	..	7	11.78	7	....	....	....	..
Hart's Location.....	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
Jackson.....	622	6	6	..	12	19.29	12	....	....	....	..
Madison.....	529	7	3	..	10	18.90	10	....	....	....	..
Moultonborough.....	901	3	3	..	6	6.65	6	....	....	....	..
Ossipee.....	1,479	9	7	..	16	10.81	15	....	....	1	..
Sandwich.....	1,077	7	6	..	13	12.07	12	....	1	....	..
Tamworth.....	1,050	5	10	..	15	14.28	13	....	..	2	..
Tuftonborough....	663	10	3	..	13	19.60	9	....	1	2	1
Wakefield.....	1,645	22	11	..	33	20.06	23	5	3	2	..
Wolfeboro.....	2,390	10	12	..	22	9.20	17	1	....	1	3
Total.....	16,895	143	106	..	249	14.73	191	18	14	19	7

No. 10.—*Continued.*

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.						
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.		
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.
4	1	.....	.....	.....	5	1	3	....	4	3	1	.....
7	.....	.....	1	.....	8	11	8	....	19	14	2	3
3	.....	.....	.....	.....	3	.....	1	....	1	1	.....	.....
6	.....	1	.....	.....	7	2	3	...	5	5	.....	.....
31	2	3	4	.....	40	25	23	....	48	45	3	.....
5	.....	.....	.....	.....	5	4	5	....	9	9	.....	.....
3	.....	.....	.....	.....	3	4	5	....	9	7	.....	2
11	.....	.....	.....	.....	11	6	7	....	13	13	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	2	4	5	....	9	8	.....	1
2	.....	.....	.....	.....	2	4	6	....	10	8	.....	2
6	.....	.....	.....	.....	6	6	3	....	9	9	.....	.....
12	.....	1	1	.....	14	15	17	....	*32	27	.....	5
2	.....	.....	.....	.....	2	10	5	....	15	13	1	1
6	.....	1	.....	.....	7	8	9	....	17	17	.....	.....
3	.....	1	.....	.....	4	11	5	....	16	16	.....	.....
16	1	3	2	.....	22	17	10	....	27	26	1	.....
20	1	5	.....	.....	26	8	23	....	31	28	1	2
139	5	15	8	.....	167	136	138	....	274	249	9	16

\* Died at county farm, 8.

Table  
Births, Marriages, and Deaths for  
Merrimack

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated
Allenstown .....	1,496	11	22	..	33	22.05	4	22	2	5	..
Andover .....	1,179	9	17	..	26	22.05	19	2	..	3	2
Boscawen .....	1,455	8	7	..	15	10.30	9	3	3	..	..
Bow .....	617	4	9	..	13	21.06	9	1	1	2	..
Bradford .....	805	2	5	..	7	8.69	7	..	..	..	..
Canterbury .....	821	7	4	..	11	13.39	11	..	..	..	..
Chichester .....	598	4	4	..	8	13.37	6	1	..	..	1
Concord .....	19,632	189	196	..	385	19.61	176	119	42	45	3
Danbury .....	654	3	3	..	6	9.17	5	..	..	..	1
Dunbarton .....	551	4	3	..	7	12.70	6	..	..	1	..
Epsom .....	771	4	4	..	8	10.37	6	1	..	1	..
Franklin .....	5,846	69	60	..	129	22.06	48	44	18	14	5
Henniker .....	1,507	14	8	..	22	14.59	16	3	..	3	..
Hill .....	603	2	6	..	8	13.26	8	..	..	..	..
Hooksett .....	1,665	11	13	..	24	14.41	8	7	4	5	..
Hopkinton .....	1,652	18	11	..	29	17.56	25	..	..	4	..
Loudon .....	960	9	5	..	14	14.58	11	..	..	1	2
Newbury .....	424	3	5	..	8	18.86	8	..	..	..	..
New London .....	768	7	5	..	12	15.62	11	..	1	..	..
Northfield .....	1,227	19	8	..	27	22.00	13	5	3	6	..
Pembroke .....	3,183	47	49	..	96	30.16	23	53	8	12	..
Pittsfield .....	2,129	23	23	..	46	21.60	28	11	3	4	..
Salisbury .....	604	2	6	..	8	13.24	6	1	1	..	..
Sutton .....	776	6	7	..	13	16.75	12	..	..	1	..
Warner .....	1,358	13	8	..	21	15.46	18	1	..	2	..
Webster .....	496	8	2	..	10	20.16	9	1	..	..	..
Wilmot .....	653	2	1	..	3	4.59	3	..	..	..	..
Total .....	52,430	498	491	..	989	18.86	505	275	86	109	14

No. 10.—Continued.

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
2	5	1	1	....	9	13	9	..	22	14	3	5	14.70
8	..	..	..	..	8	5	10	..	15	13	1	1	12.72
5	2	1	..	..	8	27	22	..	*49	41	3	5	33.67
7	..	..	..	..	7	10	6	..	16	16	..	..	25.93
4	..	..	..	..	4	10	6	..	16	16	..	..	19.87
5	..	..	..	..	5	7	9	..	16	12	..	4	19.48
124	27	26	24	....	201	10	8	..	18	18	..	..	30.10
10	..	..	..	..	10	235	180	..	†415	325	78	12	21.3
5	..	..	..	..	5	6	4	..	10	6	2	2	15.29
4	..	..	..	..	4	3	3	..	6	6	..	..	10.89
29	8	6	6	....	49	6	5	..	11	10	1	..	14.26
9	1	2	..	..	12	37	44	..	†81	64	15	2	13.85
4	..	..	1	..	5	8	13	..	21	20	..	1	13.93
10	5	1	4	....	20	5	6	..	11	10	1	..	18.24
6	..	..	..	..	6	12	20	..	32	22	10	..	19.21
6	1	1	..	..	8	18	18	..	36	32	2	2	21.79
5	..	..	..	..	5	9	14	..	23	22	1	..	23.95
8	2	1	..	..	11	4	3	..	7	7	..	..	16.50
7	1	3	..	..	11	5	7	..	12	11	..	1	15.62
11	8	4	2	....	25	11	12	..	23	18	5	..	18.74
17	2	1	4	1	25	35	25	..	60	44	15	1	18.84
1	..	..	..	..	1	23	23	..	46	38	4	4	21.60
3	..	1	..	..	4	3	4	..	7	5	2	..	11.58
12	..	2	..	..	14	6	4	..	10	7	3	..	12.88
4	..	..	..	..	4	14	12	..	26	25	1	..	19.14
6	..	..	..	..	6	3	3	..	6	6	..	..	12.09
312	62	50	42	1	467	6	4	..	10	7	1	2	15.31
312	62	50	42	1	467	531	474	..	1,005	815	148	42	19.16

\* Died at county farm, 20.

† Died at public institutions, 144.

‡ Died at public institutions, 3.



Table  
Births, Marriages, and Deaths for  
Hillsborough

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Amherst.....	1,231	9	6	1	16	12.99	9	4	1	2	..
Antrim.....	1,366	8	5	..	13	9.44	6	2	..	1	4
Bedford.....	1,148	13	14	..	27	23.51	13	4	4	6	..
Bennington.....	667	6	5	..	11	16.49	7	3	1	..	..
Brookline.....	606	2	5	..	7	11.55	5	1	1	..	..
Deering.....	486	4	2	..	6	12.34	3	1	..	..	2
Francetown.....	693	7	5	..	12	17.32	10	..	1	1	..
Goffstown.....	2,528	21	19	..	*40	15.82	23	7	3	5	2
Greenfield.....	605	2	3	..	5	8.26	4	1	..	..	..
Greenville.....	1,608	21	19	..	40	24.87	4	24	6	6	..
Hancock.....	642	3	8	..	11	17.13	7	2	1	1	..
Hillsborough.....	2,254	13	27	..	40	17.74	31	4	2	1	2
Hollis.....	910	3	9	..	12	13.18	8	3	1	..	..
Hudson.....	1,261	13	12	..	25	19.82	12	4	5	4	..
Litchfield.....	243	1	..	..	1	4.11	..	..	..	1	..
Lyndeborough.....	686	7	3	..	10	14.58	7	..	2	1	..
Manchester.....	56,987	910	870	1	1,781	31.25	333	1,095	146	178	29
Mason.....	358	5	2	..	7	19.55	4	..	1	1	1
Merrimack.....	1,234	2	1	..	3	2.43	3	..	..	..	..
Milford.....	3,739	42	38	..	80	21.39	32	29	13	6	..
Mont Vernon.....	453	3	1	..	4	8.82	2	1	1	..	..
Nashua.....	23,898	316	327	..	643	26.90	152	362	66	53	10
New Boston.....	1,002	7	5	..	12	11.97	7	..	1	4	..
New Ipswich.....	911	8	10	..	18	19.75	3	9	2	3	1
Pelham.....	875	8	4	..	12	13.71	5	4	1	2	..
Peterborough.....	2,527	23	25	..	48	18.99	31	11	3	2	1
Sharon.....	122	..	2	..	2	16.39	1	..	..	..	1
Temple.....	313	2	2	..	4	12.77	4	..	..	..	..
Weare.....	1,553	19	11	..	30	19.31	22	3	2	2	1
Wilton.....	1,696	14	17	..	31	18.28	17	6	1	6	1
Windsor.....	38	..	..	..	..	..	..	..	..	..	..
Total.....	112,640	1,492	1,457	2	2,951	26.19	765	1,580	265	286	55

\* Born at county farm, 10.

No. 10.—Continued.

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
10	.....	1	2	.....	13	10	12	.....	22	21	.....	1	17.87
5	.....	1	.....	.....	6	6	7	5	12	10	.....	2	8.74
3	1	1	.....	.....	5	12	9	.....	21	16	5	.....	18.29
1	.....	1	1	.....	3	5	6	.....	11	7	1	3	16.49
2	.....	.....	.....	.....	2	7	6	.....	13	12	.....	1	21.45
.....	.....	.....	.....	.....	.....	8	4	.....	12	10	.....	2	24.68
6	.....	1	2	.....	9	5	7	.....	12	12	.....	.....	17.32
7	2	2	1	.....	12	58	43	.....	*101	73	23	5	39.95
1	.....	.....	.....	.....	1	5	4	.....	9	8	.....	1	14.87
4	3	.....	2	.....	9	13	10	.....	23	15	7	1	14.30
2	.....	.....	.....	.....	2	10	7	.....	17	14	2	1	26.48
18	4	2	4	1	29	19	21	.....	40	35	3	2	17.74
2	.....	.....	2	.....	4	2	8	.....	10	9	.....	1	10.98
8	1	.....	.....	.....	9	9	11	.....	20	16	3	1	15.85
1	.....	.....	.....	.....	1	4	1	.....	5	4	.....	1	20.55
3	1	.....	.....	.....	4	3	8	.....	11	9	1	1	16.03
217	295	96	82	.....	690	617	613	4	†1,234	388	839	7	21.65
2	.....	1	.....	.....	3	8	5	.....	13	12	1	.....	36.81
6	.....	1	.....	.....	7	9	3	.....	12	10	1	1	9.72
21	9	2	1	.....	33	28	27	.....	55	45	10	.....	14.71
1	1	.....	.....	.....	2	3	3	.....	6	6	.....	.....	13.24
157	133	42	32	1	365	226	209	1	‡436	325	104	7	18.24
7	.....	.....	1	.....	8	8	11	.....	19	19	.....	.....	18.96
1	1	1	1	.....	4	6	7	.....	13	11	2	.....	14.27
4	.....	3	2	.....	9	4	3	.....	7	6	1	.....	8.00
17	4	.....	7	.....	28	24	18	.....	42	35	5	2	16.62
.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	1	.....	8.18
5	.....	.....	.....	.....	5	.....	1	.....	1	1	.....	.....	3.19
9	.....	1	.....	.....	10	14	7	.....	21	19	1	1	13.52
6	4	7	.....	.....	17	9	18	.....	27	20	6	1	15.91
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
526	459	163	140	2	1,290	1,134	1,087	5	2,226	1,168	1,016	42	19.76

\* Died at county farm, 56.

† Died at public institutions, 185.

‡ Died at public institutions, 36.

Table  
Births, Marriages and Deaths for  
Cheshire

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.				Parentage.					
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Alstead.....	799	6	6	..	12	15.14	10	...	1	1	..
Chesterfield.....	981	4	4	..	8	8.15	5	2	...	...	1
Dublin.....	620	2	2	..	4	6.45	3	1	...	...	...
Fitzwilliam.....	987	17	16	1	34	34.44	12	13	4	3	2
Gilsum.....	590	5	6	..	11	18.64	7	2	1	...	1
Harrisville.....	791	8	8	..	16	20.22	7	4	4	1	..
Hinsdale.....	1,933	22	13	..	35	18.10	24	6	1	4	..
Jaffrey.....	1,891	20	31	..	51	26.96	12	25	2	11	1
Keene.....	9,165	102	101	..	203	22.14	130	34	18	19	2
Marlborough.....	1,524	20	17	..	37	24.27	13	11	2	9	2
Marlow.....	488	3	5	..	8	16.39	7	...	...	...	1
Nelson.....	295	1	3	..	4	13.56	3	...	...	1	..
Richmond.....	469	2	8	..	10	21.78	5	2	...	2	1
Rindge.....	855	4	3	..	7	8.18	5	1	...	1	..
Roxbury.....	100	2	3	..	5	50.00	4	1	...	...	..
Stoddard.....	367	4	2	..	6	16.34	4	...	2	...	..
Sullivan.....	287	5	2	..	7	24.39	5	2	...	...	..
Surry.....	250	2	...	..	2	8.00	2	...	...	...	..
Swanzy.....	1,570	13	13	..	26	16.56	18	3	2	3	..
Troy.....	1,527	19	21	..	40	26.19	12	17	3	5	3
Walpole.....	2,693	40	25	..	65	24.13	23	33	4	4	1
Westmoreland.....	875	...	2	..	2	2.28	2	...	...	...	..
Winchester.....	2,274	28	23	1	52	22.86	33	15	1	1	2
Total.....	31,321	329	314	2	645	20.59	346	172	45	65	17

No. 10.—Continued.

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
5					5	5	8		13	13			16.27
2	1	3			6	7	5		12	11		1	12.23
5			1		6	1	1		2	2			3.22
4	3				7	3	11		14	12	1	1	14.18
16	2	3	2		23	3	5		8	7	1		13.55
10	2	5			17	4	4		8	6	1	1	10.11
82	8	8	13		111	15	12		27	19	4	4	13.96
5	2				7	15	14	1	30	26	3	1	16.39
2					2	73	107		180	133	34	13	19.63
3					3	22	9		31	31			20.34
7					7	9	11		20	17	2	1	40.98
3			1		4	1	2		3	3			10.16
7					7	1	5		6	5	1		13.07
1					1	8	6		14	13		1	16.37
3					3	1	1		2	1			10.00
2					2	3	3		6	2	3	1	16.34
2					2	2	1		3	3			10.45
19	2	2	1		24	2			2	2			8.00
10	9	2			21	11	11		22	20	1	1	14.01
16	4	2	1		23	12	13		25	19	6		16.37
8		1			9	22	14		36	27	8	1	13.36
26	7				33	21	6		*27	19	4	4	30.85
						17	17		34	29	5		14.95
228	40	26	20	...	314	257	266	1	524	420	74	30	16.72

\* Died at county farm, 12.

Table  
Births, Marriages and Deaths for  
Sullivan

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Acworth.....	594	8	4	..	12	20.20	11	....	1	....	..
Charlestown.....	1,473	19	15	..	34	23.08	24	5	1	4	..
Claremont.....	6,498	79	69	..	148	22.77	67	49	16	14	2
Cornish.....	962	11	8	..	19	19.75	15	2	1	1	..
Croydon.....	372	.....	1	..	1	2.68	1	.....	.....	.....	..
Goshen.....	345	2	2	..	4	11.59	4	.....	.....	.....	..
Grantham.....	374	3	4	..	7	18.71	6	.....	.....	1	..
Langdon.....	339	2	3	..	5	14.74	5	.....	.....	.....	..
Lempster.....	391	.....	4	..	4	10.23	3	....	1	.....	..
Newport.....	3,126	43	35	1	79	25.27	47	19	6	6	1
Plainfield.....	1,114	10	7	..	17	15.26	15	.....	.....	2	..
Springfield.....	439	5	3	..	8	18.22	7	.....	.....	1	..
Sunapee.....	946	10	5	..	15	15.85	10	.....	.....	4	1
Unity.....	572	7	5	..	*12	20.97	8	2	....	1	1
Washington.....	464	1	.....	..	1	2.15	1	.....	.....	.....	..
Total.....	18,009	200	165	1	366	20.32	224	77	26	34	5

\* Born at county farm, 1.

No. 10.—*Continued.*

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death rate per 1,000.
4					4	3	4		7	6	1		11.78
17	1	1	3		22	17	15		32	31		1	21.72
50	16	6	9		81	64	59		123	101	19	3	18.92
4		2			6	8	5		13	12	1		13.51
1		1	1		3	4	1		5	5			13.44
						3	5		8	6	2		23.18
2					2	4	2		6	5	1		16.04
1					1	5	2		7	7			20.64
4					4	2	1		3	2	1		7.67
36	9	9	1		55	34	25		59	54	2	3	18.87
6					6	9	3		12	9	3		10.77
2					2	3	2		5	4		1	11.39
12	1	1	3	1	18	14	3		17	14	2	1	17.97
2					2	6	7		*13	9	3	1	22.72
1					1	2	3		5	4		1	20.77
142	27	20	17	1	207	178	137		315	269	35	11	17.43

\* Died at county farm, 7.



Table  
Births, Marriages, and Deaths for  
Grafton

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Alexandria.....	630	5	4	..	9	14.28	9	..	..	..	..
Ashland.....	1,289	14	16	..	30	23.27	17	4	4	5	..
Bath.....	1,006	8	6	1	15	14.91	12	..	2	1	..
Benton.....	209	..	..	..	..	..	..	..	..	..	..
Bethlehem.....	1,261	9	7	..	16	12.68	7	5	1	3	..
Bridgewater.....	244	2	2	..	4	16.39	4	..	..	..	..
Bristol.....	1,600	14	9	..	23	14.37	15	3	2	1	2
Campton.....	999	6	8	..	14	14.01	11	..	2	1	..
Canaan.....	1,444	13	13	..	26	18.01	22	..	2	1	1
Dorchester.....	308	2	3	..	5	16.23	2	2	..	1	..
Easton.....	249	3	..	..	3	12.04	2	1	..	..	..
Ellsworth.....	107	1	..	..	1	9.34	1	..	..	..	..
Enfield.....	1,845	19	20	..	39	21.13	24	8	3	4	..
Franconia.....	655	2	6	..	8	12.21	3	2	1	1	1
Grafton.....	748	12	4	..	16	21.38	12	..	3	1	..
Groton.....	346	3	..	..	3	8.67	2	..	..	..	1
Hanover.....	1,884	17	18	..	35	18.98	28	1	2	2	2
Haverhill.....	3,414	39	25	..	64	18.74	45	6	8	3	2
Hebron.....	214	1	2	..	3	14.01	2	1	..	..	..
Holderness.....	662	3	6	..	9	13.59	8	..	..	1	..
Landaff.....	500	4	4	..	8	16.00	6	2	..	..	..
Lebanon.....	4,965	59	66	..	125	25.17	69	24	19	10	3
Lincoln.....	541	16	11	..	27	49.90	5	16	3	2	1
Lisbon.....	2,221	9	10	..	19	8.55	12	3	3	1	..
Littleton.....	4,066	38	55	..	93	22.87	48	15	18	10	2
Livermore.....	191	1	..	..	1	5.23	1	..	..	..	..
Lyman.....	426	5	3	..	8	18.77	8	..	..	..	..
Lyme.....	1,080	9	15	..	24	22.22	17	2	3	2	..
Monroe.....	545	7	3	..	10	18.34	5	2	3	..	..
Orange.....	213	1	3	..	4	18.77	3	..	1	..	..
Orford.....	890	8	9	..	17	19.10	12	1	1	1	2
Piermont.....	637	3	5	..	8	12.55	6	..	1	1	..
Plymouth.....	1,972	14	23	..	37	18.76	28	2	3	3	1
Rumney.....	837	8	3	..	11	13.13	10	..	1	..	..
Thornton.....	552	2	5	..	7	12.68	6	..	1	..	..
Warren.....	799	8	5	..	13	16.27	6	1	4	..	2
Waterville.....	50	..	..	..	..	..	..	..	..	..	..
Wentworth.....	617	5	7	..	12	19.45	9	..	2	1	..
Woodstock.....	628	9	2	..	11	17.51	6	2	1	2	..
Total.....	40,844	379	378	1	758	18.55	483	103	94	58	20

No. 10.—Continued.

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
6					6	8	2		10	7		3	15.87
8	1	4	2	1	16	12	14		26	22	2	2	20.17
11		1	1		13	7	5		12	11		1	11.92
3				1	4	1	2		3	1	2		14.85
7		4			11	4	14		18	14	3	1	14.27
						3	1		4	4			16.39
13		1			14	15	12		27	25		2	16.87
6			2		9	7	8		15	11	1	3	15.01
13		1			14	21	25		46	29	8	9	31.85
1					1	1	2		3	2	1		9.74
		2			2	4	2		6	5		1	24.08
						1			1	1			9.34
18	5	2			25	12	13		25	19	6		13.53
6		1			7	5	6		11	10		1	16.79
7					7	3	6		9	7	1	1	12.03
1			1		2	1	1		2	2			5.77
14		6	2		22	32	28		*60	44	12	4	32.53
39	2	4	9		54	33	37		70	62	4	4	20.50
2			1		3	3	1		4	4			18.69
2		1			3	9	8		17	16		1	25.67
4	1		1		6	6	6		12	10	1	1	24.00
52	4	6	3		65	43	43		86	59	12	15	17.32
3	6	3	3		15	11	1		12	6	3	3	22.18
13	1	6	3		23	14	17		31	29	2		13.95
27	3	4	5		39	30	23		53	45	6	2	13.03
						1			1			1	5.23
1					1	6	3		9	8	1		21.12
9		1			10	12	8		20	15	3	2	18.51
4		1			5	2	3		5	4		1	9.17
1					1	4	1		5	5			23.47
2					2	12	8		20	20			22.47
7					7	2	6		8	7		1	12.55
29	1	6	1	1	38	18	24		42	33	4	5	21.29
2			1		3	1	4		5	5			5.97
5	1				6	2	4		6	6			10.86
3	1		2		6	1	4		5	5			6.25
1		1			2	2	6		8	5	1	2	12.96
5	2				9	4	5		9	7	2		14.33
325	28	58	37	3	451	353	353		706	565	75	66	17.28

\* Died at public institution, 25.

† Died from railroad accident, 23.

Table  
Births, Marriages, and Deaths for  
Coos

TOWNS.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Berlin .....	8,886	244	266	3	513	57.73	47	353	67	44	2
Cambridge .....	17										
Carroll .....	710	3	5		8	11.26	3	1	1	2	1
Clarksville .....	307	2	7		9	29.31	7		1	1	
Colebrook .....	1,876	20	20		40	21.32	30	2	5	3	
Columbia .....	690	3	2		5	7.24	2	1	2		
Dalton .....	592	3	1		4	6.75	3		1		
Dummer .....	349	4	5		9	25.78	5	1	2	1	
Errol .....	305	2			2	6.75	1				1
Gorham .....	1,797	19	29		48	26.71	13	19	8	7	1
Jefferson .....	1,080	6	15		21	19.44	15	2	1	2	1
Lancaster .....	3,190	26	29		55	17.24	28	6	12	6	3
Milan .....	1,135	7	11		18	15.85	8	3	5	2	
Millsfield .....	41										
Northumberland .....	1,977	19	15		34	17.19	22	6	3	3	
Pittsburg .....	687	7	2		9	13.10	4	3	1		1
Randolph .....	137		1		1	7.29				1	
Shelburne .....	283	1	4		5	17.66	2	2			1
Stark .....	733	9	8		17	23.19	8	2	4	3	
Stewartstown .....	1,150	12	8		20	17.39	11	4	3	1	1
Stratford .....	968	6	9		15	15.49	11	1	2	1	
Whitefield .....	2,157	13	15		28	12.98	8	5	5	5	5
Total .....	†29,468	406	452	3	861	29.21	228	411	123	82	17

† Including unincorporated township and grants.

No. 10.—*Continued.*

the year ending December 31, 1907.

County.

MARRIAGES.						DEATHS.							
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Sex.				Nativity.			
						Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
48	48	10	30	....	136	91	66	....	†157	108	42	7	17.66
2	....	2	2	....	6	1	1	....	1	....	1	....	58.82
3	....	....	....	....	3	7	4	....	8	6	1	1	11.26
23	2	2	7	....	34	1	4	....	5	5	....	....	16.28
4	....	....	....	....	4	22	12	....	34	32	2	....	18.12
4	....	....	....	....	4	5	5	....	10	9	1	....	14.48
4	1	1	1	....	7	6	5	....	11	11	....	....	18.41
1	....	....	1	....	2	3	....	....	3	2	....	1	8.59
1	....	....	....	....	1	2	....	....	2	1	1	....	6.75
34	6	3	10	....	53	18	12	....	30	22	6	2	16.69
6	1	1	....	....	8	3	4	....	7	5	1	1	6.48
19	3	6	2	....	30	24	33	....	57	39	14	4	17.86
8	....	....	3	....	11	7	5	....	12	9	2	1	10.57
11	....	2	6	....	19	25	16	....	41	27	10	4	20.73
1	1	....	....	....	2	4	3	....	7	4	1	2	10.19
....	....	....	....	....	....	1	....	....	1	1	....	....	7.29
2	....	....	1	....	3	....	....	....	....	....	....	....	....
4	....	....	1	....	5	6	8	....	14	12	1	1	19.09
3	....	1	2	1	7	14	11	....	*25	12	9	4	21.73
4	....	....	....	....	4	8	7	....	15	11	4	....	15.49
14	3	3	3	....	23	24	16	....	†40	30	6	4	18.54
192	65	31	69	1	358	272	208	....	480	346	102	32	16.28

† Died at public institutions, 11.

\* Died at county farm, 8.

‡ Died at public institution, 16.

Table  
Births, Marriages, and Deaths for  
Recapitulation

COUNTIES.	Population in 1900.	BIRTHS.									
		Sex.					Parentage.				
		Male.	Female.	Not stated.	Total.	Rate per 1,000.	Both American.	Both foreign.	American mother and foreign father.	American father and foreign mother.	Not stated.
Rockingham.....	51,118	503	497	5	1,005	19.61	546	273	78	86	22
Strafford.....	39,337	464	378	..	842	21.40	328	378	68	56	12
Belknap.. .....	19,526	219	197	1	417	21.35	226	99	40	40	12
Carroll.....	16,895	143	106	..	249	14.73	191	18	14	19	7
Merrimack.....	52,430	498	491	..	989	18.86	505	275	86	109	14
Hillsborough.....	112,640	1,492	1,457	2	2,951	26.19	765	1,580	265	286	55
Cheshire.....	31,321	329	314	2	645	20.59	346	172	45	65	17
Sullivan.....	18,009	200	165	1	366	20.32	224	77	26	34	5
Grafton.....	40,844	379	378	1	758	18.55	483	103	94	58	20
Coös.....	29,468	406	452	3	861	29.21	228	411	123	82	17
Total.....	411,588	4,633	4,435	15	9,083	22.06	3,842	3,386	839	835	181

No. 10.—*Concluded.*

the year ending December 31, 1907.

by Counties.

MARRIAGES.						DEATHS.							
						Sex.				Nativity.			
Both American.	Both foreign.	Husband American.	Wife American.	Not stated.	Total.	Male.	Female.	Not stated.	Total.	American.	Foreign.	Not stated.	Death-rate per 1,000.
449	55	51	48	1	604	487	445	..	932	749	135	48	18.23
330	77	44	44	4	499	335	331	..	666	490	127	49	16.93
130	16	26	17	....	189	183	175	..	358	297	40	21	18.33
139	5	15	8	....	167	136	138	..	274	249	9	16	16.21
312	62	50	42	1	467	531	474	..	1,005	815	148	42	19.16
526	459	163	140	2	1,290	1,134	1,037	5	2,226	1,168	1,016	42	19.76
228	40	26	20	....	314	257	266	1	524	420	74	30	16.72
142	27	20	17	1	207	178	137	..	315	269	35	11	17.48
325	28	58	37	3	451	353	353	..	706	565	75	66	17.28
192	65	31	69	1	358	272	208	..	480	346	102	32	16.28
2,773	834	484	442	13	4,546	3,866	3,614	*6	7,486	5,368	1,761	357	18.18

\* Classed with males.



Table  
Births by Sex and

COUNTIES.		January.	February.	March.	April.	May.
Rockingham.....	Males.....	40	43	40	47	49
	Females.....	40	33	49	38	43
	Not stated.....				1	2
Strafford.....	Males.....	39	35	44	41	42
	Females.....	30	30	31	36	29
	Not stated.....					
Belknap .....	Males.....	19	10	24	14	24
	Females.....	10	13	16	18	18
	Not stated.....					
Carroll.....	Males.....	6	7	8	18	8
	Females.....	13	10	6	11	8
	Not stated.....					
Merrimack .....	Males.....	35	35	46	36	43
	Females.....	52	22	30	39	48
	Not stated.....					
Hillsborough.....	Males.....	131	125	129	126	103
	Females.....	119	127	143	110	120
	Not stated.....					
Cheshire.....	Males.....	28	25	40	26	30
	Females.....	28	19	27	34	31
	Not stated.....					
Sullivan.....	Males.....	12	17	20	13	24
	Females.....	10	9	7	20	18
	Not stated.....					
Grafton.....	Males.....	25	27	32	26	38
	Females.....	25	31	34	32	43
	Not stated.....					
Cooks.....	Males.....	34	44	23	28	37
	Females.....	37	28	56	46	38
	Not stated.....			1		
Total.....	Males.....	369	368	406	375	398
	Females.....	364	322	404	384	396
	Not stated.....			1	1	2
Grand total.....		733	690	811	760	796

No. 11.

Month, by Counties, 1907.

June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
45 44	32 33	41 55	36 49 1	37 46	47 29 1	46 38	.....	503 497 5	1,005
35 34	38 35	53 28	35 34	38 35	28 24	36 32	.....	464 378	842
17 18	15 27	25 17	18 16	25 12	11 15	17 17 1	.....	219 197 1	417
16 8	18 8	18 12	16 11	3 6	15 10	10 3	.....	143 106	249
37 43	58 49	52 54	49 39	37 29	31 41	39 44 1	.....	498 491	989
123 130 1	148 118	152 150	122 136	119 110	105 86	109 103 1	.....	1,492 1,457 2	2,951
27 18	27 35 1	19 28	26 26	35 21 1	20 24	26 23	.....	329 314 2	645
22 16	19 13	18 17	17 23 1	12 15	17 8	9 9	.....	200 165 1	366
31 33	37 32 1	37 33	37 28	30 32	29 26	30 29	.....	379 378 1	758
31 34	34 31 2	42 39	34 39	32 30	31 30	33 43	.....	406 452 3	861
384 378 1	426 381 4	457 433	390 401 2	368 336 1	337 294 1	355 341 2	..... 1	4,633 4,435 15	
763	811	890	793	705	632	698	1	9,083	9,083

Table  
Births showing age of mother,

NUMBER OF CHILD.	Under 15.			15 to 20.			20 to 25.			25 to 30.			30 to 35.		
	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.
1st.....	2	1	....	423	140	3	597	432	1	296	209	2	129	72	....
2d.....	...	...	...	121	28	1	393	310	3	313	254	1	159	99	1
3d.....	...	...	...	23	8	....	229	179	1	233	251	3	171	120	1
4th.....	...	...	...	2	...	...	88	59	1	162	207	2	133	139	2
5th.....	...	...	...	...	...	...	29	23	....	112	114	....	101	128	1
6th.....	...	...	...	1	...	...	5	2	....	51	85	1	69	106	....
7th.....	...	...	...	...	...	...	1	...	...	21	34	....	61	87	....
8th.....	...	...	...	...	...	...	...	...	...	9	19	....	30	61	....
9th.....	...	...	...	...	...	...	...	...	...	...	8	....	24	38	....
10th.....	...	...	...	...	...	...	...	...	...	2	5	....	13	31	....
11th.....	...	...	...	...	...	...	1	....	...	...	...	....	7	10	....
12th.....	...	...	...	...	...	...	...	...	...	1	1	....	6	4	....
13th.....	...	...	...	...	...	...	...	...	...	...	...	....	...	2	....
14th.....	...	...	...	...	...	...	...	...	...	...	...	....	...	...	....
15th.....	...	...	...	...	...	...	...	...	...	...	...	....	...	...	....
16th.....	...	...	...	...	...	...	...	...	...	...	...	....	...	...	....
17th.....	...	...	...	...	...	...	...	...	...	...	...	....	...	...	....
18th.....	...	...	...	...	...	...	...	...	...	...	...	....	...	...	....
21st.....	...	...	...	...	...	...	...	...	...	...	...	....	...	...	....
Not stated	...	...	...	2	....	...	5	6	....	6	10	....	6	4	....
Total..	2	1	...	572	176	4	1348	1011	6	1206	1197	9	909	901	5

No. 12.

Number of Child, by Nationality, 1907.

35 to 40.			40 to 45.			45 to 50.			Not stated.			Total.			Grand total.
American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	American.	Foreign.	Not stated.	
52	26	....	9	4	....	1	1	....	14	5	2	1,523	890	8	2,421
62	35	....	7	9	....	1	....	....	17	4	1	1,072	739	7	1,818
85	60	1	17	9	....	1	....	....	6	9	....	765	636	6	1,407
70	59	....	22	10	....	2	1	....	5	1	1	484	476	6	966
48	57	1	20	13	....	1	1	....	5	4	....	315	340	2	657
50	75	....	23	16	....	1	....	....	3	3	2	203	287	3	493
50	59	....	11	17	....	1	1	....	2	4	....	146	202	....	348
35	71	....	14	22	....	1	1	....	1	3	1	90	177	1	268
33	59	1	14	24	....	1	....	....	2	2	....	74	131	1	206
15	52	....	8	29	....	2	....	....	1	1	....	39	120	....	159
12	40	1	6	29	....	1	....	....	....	1	....	26	81	1	108
6	21	....	9	18	....	3	....	....	....	....	....	22	47	....	69
2	10	....	5	18	....	1	2	....	....	....	....	8	32	....	40
.....	11	....	1	14	....	3	....	....	1	....	....	2	28	....	30
.....	6	....	....	7	....	....	....	....	....	....	....	....	13	....	13
.....	2	....	....	5	....	1	....	....	....	....	....	....	6	....	6
.....	2	....	....	2	....	....	....	....	....	....	....	....	4	....	4
.....	....	....	....	1	....	1	....	....	....	....	....	....	2	....	2
.....	....	....	....	2	....	....	....	....	....	....	....	....	2	....	2
2	2	....	....	....	....	1	1	....	9	5	7	31	28	7	66
522	645	4	166	249	....	9	19	....	66	42	14	4,800	4,241	42	9,083

\* One 52 years of age.

Table No. 13.—1907.

AGES OF GROOMS.	AGES OF BRIDES.															No. of grooms.
	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	70 to 75.	75 to 80.	Over 80.	Not stated.	
Under 20.....	*164	67	2	...	...	...	...	...	...	...	...	...	...	...	...	233
20 to 25.....	†670	819	133	30	9	...	...	...	...	...	...	...	...	...	...	1,661
25 to 30.....	‡215	552	313	85	17	6	2	...	...	...	...	...	...	...	2	1,192
30 to 35.....	§51	158	179	118	45	14	5	...	...	...	...	...	...	...	1	571
35 to 40.....	17	61	84	79	60	25	8	3	...	...	...	...	...	...	...	337
40 to 45.....	4	16	27	27	43	46	14	3	1	...	...	...	...	...	...	181
45 to 50.....	2	6	16	21	30	26	20	6	2	1	...	...	...	...	...	130
50 to 55.....	2	1	4	9	14	9	16	18	4	2	1	...	...	...	...	80
55 to 60.....	...	1	5	4	7	13	12	13	5	...	2	...	...	1	...	63
60 to 65.....	...	1	...	3	...	3	12	14	11	5	1	...	...	...	...	50
65 to 70.....	...	...	...	...	3	4	1	1	7	4	3	...	...	...	...	23
70 to 75.....	...	...	...	...	...	1	1	2	2	1	3	1	...	...	...	11
75 to 80.....	...	...	...	...	...	1	1	1	1	1	1	...	...	...	...	6
Over 80.....	...	...	...	1	...	1	1	...	...	1	1	...	...	...	...	5
Not stated.....	...	1	...	1	...	...	...	...	...	...	...	...	...	1	...	3
No. of brides.....	1,125	1,683	763	378	228	148	93	62	33	13	13	2	...	1	4	4,546

\* Three brides 15.

† One bride 14; eight brides 15.

‡ Five brides 15.

§ One bride 15.

|| One bride 15.

Table No. 14.

Still Births, by Sex, Parentage, and Months, by Counties, 1907.

COUNTIES.	SEX.		PARENTAGE.					MONTHS.														
	Male.	Female.	Not stated.	Both American.	Both foreign.	American father and foreign mother.	American father and foreign mother.	Total.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Not stated.	
Rockingham.....	38	31	.....	27	21	7	11	3	69	6	8	11	3	8	4	7	5	2	4	6	5	.....
Strafford.....	19	14	.....	14	15	.....	4	.....	33	6	3	4	4	5	3	3	2	.....	1	2	.....	.....
Belknap.....	8	5	1	11	2	.....	.....	1	14	.....	1	2	2	2	1	1	5	1	1	.....	1	.....
Carroll.....	8	5	.....	12	.....	.....	2	.....	14	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Merrimack.....	33	21	.....	28	12	4	4	6	54	3	4	5	4	6	6	7	3	6	3	3	4	.....
Hillsborough.....	68	58	4	18	73	13	19	7	130	11	10	16	13	8	12	7	9	8	9	14	13	.....
Cheshire.....	10	11	.....	11	7	2	.....	1	21	2	2	2	2	2	2	3	3	3	.....	.....	.....	.....
Sullivan.....	10	11	.....	12	4	1	2	2	21	2	1	1	3	3	2	2	2	1	1	2	1	.....
Grafton.....	33	15	.....	29	9	3	4	3	48	3	3	7	3	4	6	6	3	4	3	2	4	.....
Cooks.....	19	15	.....	12	15	4	3	.....	34	4	.....	3	3	4	5	3	2	2	3	2	3	.....
Total.....	246	186	6	174	158	34	50	22	438	37	35	51	37	43	42	40	36	24	25	31	37	.....

BIRTHS.



## Divorces.

Table No. 15.

Divorces Decreed by the Supreme Court of New Hampshire, in the year 1907, as returned by the Clerks of the Several Counties.

COUNTIES.	CAUSES OF DIVORCE.													LIBELLANTS.		Total of each county.			
	Conviction of crime and imprisonment.	Abandonment.	Abandonment and adultery.	Extreme cruelty and adultery.	Adultery.	Desertion.	Extreme cruelty.	Extreme cruelty and habitual drunkenness.	Habitual drunkenness and abandonment.	Habitual drunkenness.	Impotency.	Willing absence and refusal to cohabit.	Treatment injurious to health.	Nullity.	Treatment injurious to health and to reason.		Willing absence three years.	Males.	Females.
Rockingham.....	1	27	...	...	16	...	20	...	...	2	...	...	...	1	3	5	21	54	75
Strafford.....	...	10	2	...	3	3	8	...	...	...	...	7	...	...	...	1	10	27	37
Belknap.....	...	12	...	...	9	...	6	...	1	4	...	...	7	...	...	...	11	28	39
Carroll.....	...	6	...	...	1	5	3	2	...	...	...	...	1	...	...	...	8	10	18
Merrimack.....	...	21	...	...	17	3	15	2	...	5	...	...	6	...	2	6	23	55	78
Hillsborough.....	1	61	...	...	16	...	35	...	...	9	...	...	10	...	7	41	41	98	139
Cheshire.....	...	8	...	...	5	...	12	...	...	2	...	...	5	...	...	2	9	21	30
Sullivan.....	...	6	...	...	1	...	11	...	...	6	...	...	1	...	...	7	18	25	...
Grafton.....	...	6	...	...	14	...	11	...	...	6	...	14	5	...	...	...	18	38	56
Cooks.....	...	3	...	...	4	...	8	1	2	...	...	7	...	...	...	...	8	17	25
Total.....	3	159	2	3	92	6	126	8	3	29	...	28	36	1	5	21	156	365	522

## CAUSES OF DEATH.

Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.		I. GENERAL DISEASES.																												
		1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and sep- ticiemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Atkinson .....								1																						
Auburn .....								1		1			1										1							
Brentwood .....			1																				2							
Candia .....																														
Chester .....								1																						
Danville .....																														
Deerfield .....										2												4								
Derry .....																						11		1						
East Kingston .....																														
Epping .....		1																				3		3						
Exeter .....		1								2							1					10	2	1						
Fremont .....		1																				1								
Greenland .....																														
Hampstead .....																														
Hampton .....																	1					3		3						
Hampton Falls .....																														
Kensington .....																														
Kingston .....																														
Londonderry .....																														
Newcastle .....																														
Newfields .....																														
Newington .....																														
Newmarket .....										2																				
Newton .....																	1													
North Hampton .....																														
Northwood .....											1																			
Nottingham .....																														
Plaistow .....										2																				
Portsmouth .....		1							2	1			1									1	19	1	1	3				
Raymond .....																														
Rye .....																														
Salem .....		1					1	2														1								
Sandown .....																														
Seabrook .....									1				1																	
South Hampton .....																														
Stratham .....																														
Windham .....																	1											1		
Total .....		5					1	5	2	12			3				4					1	79	3	3	8				



Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro-spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alienation.	69. Epilepsy.	70. Convulsions; (non-puerperal; five years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nervous system.	75. Diseases of the eye.	76. Diseases of the ear.
Atkinson.....						1	1			1								
Auburn.....						1	1											
Brentwood.....		1				7	7	1	2	1								
Candia.....					1	6	6				2							
Chester.....						2	2	1		2								
Danville.....																		
Deerfield.....	1					3	3			2								
Derry.....	4					3	3	1			2							
East Kingston.....																		
Epping.....				1		1					1							
Exeter.....						7		3					1					
Fremont.....						1		1			1		1			1		1
Greenland.....						2	2	1										
Hampstead.....						2	2	1		1								
Hampton.....						2	2	1										
Hampton Falls.....	1					2	2											
Kensington.....						1	1											
Kingston.....						3	3	1										
Londonderry.....						6	6	1										
Newcastle.....						1	1											
Newfields.....	1					2	2					1						
Newington.....						1	1											
Newmarket.....	6			1	1	3	3	3					3					
Newton.....						2												
North Hampton.....																		
Northwood.....								1									1	
Nottingham.....						1										1		
Plaistow.....						2												
Portsmouth.....	3					13	2	3		1			3					
Raymond.....	2			1		1	1						1					
Rye.....						3		3				1						
Salem.....	2					3												
Sandown.....						2												
Seabrook.....								4					1					
South Hampton.....											1							
Stratham.....						1		1										
Windham.....	1					2												
Total .....	22	...	1	4	86	4	27	3	7	7	2	11	...	...	3	...	1	...

No. 16.—Continued.

## Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
1	2	3	7	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
1	1	4	5	2	1	2	1	1	1	1	1	1	1	1	1	2	6	1	1	1	1	1
1	1	6	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	2	17	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	3	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4	103	6	13	7	...	...	2	...	...	1	12	6	15	75	1	7	2	4	1	4	...



Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Atkinson.....										1		
Auburn.....										1		
Brentwood.....												
Candia.....	1											
Chester.....												
Danville.....												
Deerfield.....												
Derry.....									1	2	1	
East Kingston.....	1								1			
Epping.....										3		
Exeter.....	1									3		
Fremont.....										1		
Greenland.....												
Hampstead.....												
Hampton.....												
Hampton Falls.....									1			
Kensington.....												
Kingston.....	1											
Londonderry.....										1		
Newcastle.....												
Newfields.....												
Newington.....												
Newmarket.....										3		
Newton.....												
North Hampton.....												
Northwood.....									1			1
Nottingham.....												
Plaistow.....												
Portsmouth.....				1			1		1	9		
Raymond.....		1								1		
Rye.....												
Salem.....										1		
Sandown.....												
Seabrook.....										3		
South Hampton.....												
Stratham.....												
Windham.....												
Total.....	4	1		1			1		5	29	1	1

No. 16.—Continued.

### Counties, 1907.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.		XIV. ILL-DEFINED DISEASES.	
154. Senile debility.		154. Suicide by poisoning.		154. Causes of death unspecified or ill-defined.	
155. Suicide by poison.		155. Suicide by hanging or strangulation.		155. Sudden death.	
156. Suicide by asphyxia.		156. Suicide by drowning.		156. Causes of death unspecified or ill-defined.	
157. Suicide by hanging or strangulation.		157. Suicide by firearms.		157. Dropsy.	
158. Suicide by drowning.		158. Suicide by cutting instruments.		158. Sudden death.	
159. Suicide by firearms.		159. Suicide by jumping from high places.		159. Causes of death unspecified or ill-defined.	
160. Suicide by cutting instruments.		160. Suicide by crushing.		160. Sudden death.	
161. Suicide by jumping from high places.		161. Other suicides.		161. Causes of death unspecified or ill-defined.	
162. Suicide by crushing.		162. Fractures.		162. Sudden death.	
163. Other suicides.		163. Dislocations.		163. Causes of death unspecified or ill-defined.	
164. Fractures.		164. Other accidental traumas.		164. Sudden death.	
165. Dislocations.		165. Burns and scalds.		165. Causes of death unspecified or ill-defined.	
166. Other accidental traumas.		166. Burns from corrosive substances.		166. Sudden death.	
167. Burns and scalds.		167. Sunstroke.		167. Causes of death unspecified or ill-defined.	
168. Burns from corrosive substances.		168. Freezing.		168. Sudden death.	
169. Sunstroke.		169. Electric shock.		169. Causes of death unspecified or ill-defined.	
170. Freezing.		170. Accidental drowning.		170. Sudden death.	
171. Electric shock.		171. Inanition (starvation).		171. Causes of death unspecified or ill-defined.	
172. Accidental drowning.		172. Absorption of deleterious gases (non-suicidal).		172. Sudden death.	
173. Inanition (starvation).		173. Other acute poisonings.		173. Causes of death unspecified or ill-defined.	
174. Absorption of deleterious gases (non-suicidal).		174. Other external violence.		174. Sudden death.	
175. Other acute poisonings.		175. Dropsy.		175. Causes of death unspecified or ill-defined.	
176. Other external violence.		176. Sudden death.		176. Causes of death unspecified or ill-defined.	
177. Dropsy.		177. Causes of death unspecified or ill-defined.		177. Sudden death.	
178. Sudden death.		178. Causes of death unspecified or ill-defined.		178. Sudden death.	
179. Causes of death unspecified or ill-defined.		179. Sudden death.		179. Causes of death unspecified or ill-defined.	

Table

Causes of Death arranged by Towns and

TOWNS IN ROCKINGHAM COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Atkinson.....																			
Auburn.....																			
Brentwood.....													1						
Candia.....																			
Chester.....																			
Danville.....		1																	
Deerfield.....					2														
Derry.....						4													
East Kingston.....															1				
Epping.....																			
Exeter.....						2			1										
Fremont.....													1						
Greenland.....				1		2													
Hampstead.....															1				
Hampton.....																			
Hampton Falls.....						1													
Kensington.....																			
Kingston.....				1			1												
Londonderry.....																			
Newcastle.....															1				
Newfields.....							1												
Newington.....																			
Newmarket.....						7													
Newton.....																			
North Hampton.....																			
Northwood.....						1	1												
Nottingham.....																			
Plaistow.....																			
Portsmouth.....				4		9	4		2	1			1				1		
Raymond.....										1			4		1		3		3
Rye.....						1	1		1				1						
Salem.....			2	2		2													
Sandown.....																			
Seabrook.....																			
South Hampton.....																	1		
Stratham.....				1		1													
Windham.....				1															
Total.....	1	3	11	30	8	5	1	1	8	6	7	4	8	6	7				4



Table

Causes of Death arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	I. GENERAL DISEASES.																											
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.				
Barrington.....														1										3				
Dover.....	6		1						4							1						18	1					
Durham.....																												
Farmington.....	1						1														1	2						
Lee.....																												
Madbury.....									1													1						
Middleton.....	1																											
Milton.....	1																											
New Durham.....																1												
Rochester.....	2				1				4		1	1				2						6						
Rollinsford.....						2					1		1									4						
Somersworth.....	2				2																	8		1				
Strafford.....						1																3						
Total.....	13		1		3	4		9		2	1		2		4						14	5	1	1				

Counties, 1907.—International Classification.

[illegible]



Table

Causes of Death arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Barrington .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dover .....	..	6	..	..	4	16	..	7	..	..	..	..	1	..	..	3	..	..
Durham .....	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Farmington .....	..	1	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..
Lee .....	..	..	..	..	1	..	1	..	..	..	..	..	1	..	..	..	..	..
Madbury .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Middleton .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Milton .....	..	3	..	..	1	1	..	1	1	..	..	1	..	..	..	..	..	..
New Durham .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Rochester .....	..	1	..	..	1	8	1	1	..	1	..	..	1	..	..	1	..	..
Rollinsford .....	..	5	..	..	..	2	..	..	..	..	..	..	1	..	..	1	..	..
Somersworth .....	..	3	..	..	..	7	..	..	..	..	..	..	1	..	..	..	..	..
Strafford .....	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Total .....	2	19	..	1	6	40	1	11	1	1	..	1	5	..	..	5	..	..

No. 16.—Continued.

## Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
77. Pericarditis.		78. Acute endocarditis.		79. Organic diseases of the heart.		80. Angina pectoris.		81. Diseases of the arteries.		82. Embolism and thrombosis.		83. Diseases of the veins.		84. Diseases of the lymphatic system.		85. Hemorrhages.		86. Other diseases of the circulatory system.		87. Laryngitis.		88. Other diseases of the larynx.		89. Diseases of the thyroid body.		90. Acute bronchitis.		91. Chronic bronchitis.		92. Broncho-pneumonia.		93. Pneumonia.		94. Pleurisy.		95. Congestion and apoplexy of the lungs.		96. Gangrene of the lungs.		97. Asthma.		98. Pulmonary emphysema.		99. Other diseases of the respiratory system.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Table

Causes of Death arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Barrington.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Dover.....	..	..	2	7	14	1	..	3	..	..	..	..	1	1	2	..	2	..	..
Durham.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Farmington.....	..	..	..	3	1	..	..	1	..	..	..	..	..	1	..	..	1	..	..
Lee.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Madbury.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Middleton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Milton.....	..	..	..	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
New Durham.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Rochester.....	..	..	..	3	11	..	..	1	..	..	..	..	1	..	1	..	..	..	1
Rollinsford.....	..	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Somersworth.....	..	..	..	2	12	1	..	1	1	..	..	..	1	..	2	..	1	..	..
Strafford.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	2	17	41	2	..	2	..	9	1	..	..	..	3	2	6	..	4	..	1

No. 16.—Continued.

Counties, 1907.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.										VII. THE PUERPERAL STATE.												
119. Acute nephritis.	120. Bright's disease.	121. Other diseases of the kidneys.	122. Calculi of the urinary tract.	123. Diseases of the bladder.	124. Diseases of the urethra.	125. Diseases of the prostate.	126. Non-venereal diseases of the male genital organs.	127. Metritis.	128. Uterine hemorrhage (non-puerperal).	129. Uterine tumor.	130. Other diseases of the uterus.	131. Cysts and other tumors of the ovary.	132. Other diseases of the female genital organs.	133. Non-puerperal diseases of the breast.	134. Accidents of pregnancy.	135. Puerperal hemorrhage.	136. Other accidents of labor.	137. Puerperal septicemia.	138. Puerperal albuminuria and convulsions.	139. Phlegmasia alba dolens (puerperal).	140. Other puerperal accidents.	141. Puerperal diseases of the breast.
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	17	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	1	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	3	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...
...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	3	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
1	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	32	...	3	...	...	2	...	...	1	2	...	...	...	...	...	1	1	...	...	...	2	...

Table

Causes of Death arranged by Towns and

TOWNS IN STRAFFORD COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.		XI. EARLY INFANCY.	
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.	150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Barrington.....												
Dover.....										9	3	
Durham.....									1			
Farmington.....												
Lee.....												
Madbury.....												
Middleton.....	1											
Milton.....									1			
New Durham.....											1	
Rochester.....									2	6		
Rollinsford.....	1											
Somersworth.....									1	9	1	1
Strafford.....												
Total.....	2								5	24	5	1

No. 16.—Continued.

Counties, 1907.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.										XIV. ILL-DEFINED DISEASES.		
154 Senile debility.		155 Suicide by poison.										156 Suicide by asphyxia.		
157 Suicide by hanging or strangulation.		158 Suicide by drowning.										159 Suicide by firearms		
160 Suicide by cutting instruments.		161 Suicide by jumping from high places.										162 Suicide by crushing.		
163 Other suicides.		164 Fractures.										165 Dislocations.		
166 Other accidental traumas.		167 Burns and scalds.										168 Burns from corrosive substances.		
169 Sunstroke.		170 Freezing.										171 Electric shock.		
172 Accidental drowning.		173 Inanition (starvation).										174 Absorption of deleterious gases (non-suicidal).		
175 Other acute poisonings.		176 Other external violence.										177 Dropsy.		
178 Sudden death.		179 Causes of death unspecified or ill-defined.												
4	16	1	1	2	1	3	4	4	1	1	37	2	1	13
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31	1	1	1											



Table

Causes of Death arranged by Towns and

TOWNS IN BELKNAP COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Alton .....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Barnstead .....	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Belmont .....	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Center Harbor .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gilford .....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Gilmanton .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..
Laconia .....	..	..	..	..	..	..	4	2	2	..	..	1	..	..	..	4	..	..	..	..	..	13	..	1	..	..	..	..	..
Meredith .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..
New Hampton .....	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..
Sanbornton .....	..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Tilton .....	1	1	..	..	..	5	1	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..
Total .....	1	1	1	..	13	2	4	1	1	1	1	1	..	..	9	..	..	..	..	..	23	..	1	..	..	..	..	..	..



Table

Causes of Death arranged by Towns and

TOWNS IN BELKNAP COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Alton.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Barnstead.....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Belmont ..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Center Harbor...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gilford.....	..	..	..	..	..	1	3	..	..	..	..	..	..	..	..	..	..	..
Gilmanton.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Laconia.....	3	2	..	..	13	15	..	1	1	..	1	1	..	..	2	..	..	..
Meredith.....	1	..	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..
New Hampton..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sanbornton.....	1	..	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..
Tilton .....	1	1	..	1	5	2	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	1	5	2	1	29	2	21	..	1	1	1	1	1	..	2	..	..	..

No. 16.—Continued.

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.											
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
...	...	4	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	1	1	...	3	...	...	...	...	...	...
1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...
...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
...	...	6	1	1	2	...	...	...	...	...	...	...	5	1	3	8	...	1	...	...	...	...
...	1	7	...	...	1	...	...	...	...	...	...	...	1	...	3	...	...	...	...	1	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...	3	...	...	...	...	...	...
...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...
..	...	3	...	...	2	...	...	...	...	...	...	...	1	...	2	...	...	...	...	...	...	...
1	1	30	4	1	6	...	...	...	...	...	...	...	8	3	5	25	...	2	...	1	...	...

Table

Causes of Death arranged by Towns and

TOWNS IN BELKNAP COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Alton.....									1										
Barnstead.....																			
Belmont.....						1	1												
Center Harbor....																			
Gilford.....			1	1															
Gilmanton.....															1				
Laconia.....			1	6	6					2									
Meredith.....				3	1				1										1
New Hampton.....																			
Sanbornton.....																			
Tilton.....								1					1				2		1
Total.....		2	10		8	1		3	2				1	1	1		2		2







No. 16.—*Continued.*

Counties, 1907.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																				XIV. ILL-DEFINED DISEASES.			
154. Senile debility.	155. Suicide by poison.	156. Suicide by asphyxia.	157. Suicide by hanging or strangulation.	158. Suicide by drowning.	159. Suicide by firearms.	160. Suicide by cutting instruments.	161. Suicide by jumping from high places.	162. Suicide by crushing.	163. Other suicides.	164. Fractures.	165. Dislocations.	166. Other accidental traumas.	167. Burns and scalds.	168. Burns from corrosive substances.	169. Sunstroke.	170. Freezing.	171. Electric shock.	172. Accidental drowning.	173. Inanition (starvation).	174. Absorption of deleterious gases (non-suicidal).	175. Other acute poisonings.	176. Other external violence.	177. Dropsy.	178. Sudden death.	179. Causes of death unspecified or ill-defined.
1																									1
1																		1							
1												1													
																						2			
1																									
1																									
15		1										1						1					2		5
8												1													1
2																									
1																									
5																		1							1
36		1										3						3				2	2		8

Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Albany .....																													
Bartlett.....																						2							
Brookfield.....																													
Chatham.....																													
Conway.....										1																			
Eaton .....										1																			
Effingham.....																						2							
Freedom.....																1						1	1						
Hart's Location.....																													
Jackson.....																													
Madison .....																						1							
Moultonborough.....																													
Ossipee . . . . .									1																				
Sandwich.....									1													1							
Tamworth.....																						1							
Tuftonborough.....																													
Wakefield .....																						3							
Wolfeboro .....																													
Total.....									4							1						12	1	1					



Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																		
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.	
Albany .....					1														
Bartlett.....																			
Brookfield .....																			
Chatham .....						1													
Conway.....		2		1	4	1		1					1						
Eaton .....	1				1	1													
Effingham .....					1		1												
Freedom.....									1										
Hart's Location.....																			
Jackson.....				1	1			1											
Madison .....																			
Moultonborough.....						1													
Ossipee .....						2		2											
Sandwich.....						1	1	1											
Tamworth.....						1	1	1											
Tuftonborough.....						2													
Wakefield .....						4													
Wolfeboro.....						5										1			
Total.....	3			3	24	4	5	2	1				1			1			

No. 16.—*Continued.*

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.											
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	3	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	1	1	7	1	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	8	.....	.....	4	.....	.....	1	.....	.....	.....	.....	1	1	1	1	.....	.....	.....	.....	.....	.....
.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	1	.....	.....	.....	.....
.....	.....	7	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	30	1	1	7	.....	.....	2	.....	1	.....	.....	3	2	1	30	.....	2	.....	.....	.....	.....



Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under two years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Albany.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bartlett.....	.	.	.	.	1	.	.	.	1	.	.	.	2	.	.	.	.	.	.
Brookfield.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chatham.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Conway.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eaton.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Effingham.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Freedom.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Hart's Location...	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jackson.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Madison.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moultonborough...	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ossipee.....	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Sandwich.....	.	1	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.
Tamworth.....	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tuftonborough...	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wakefield.....	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Wolfeboro.....	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Total.....	1	5	1	1	1	1	1	3	.	.	.	.	2	.	.	2	.	1	.



Table

Causes of Death arranged by Towns and

TOWNS IN CARROLL COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Albany.....										1		
Bartlett.....												
Brookfield.....												
Chatham.....												
Conway.....										2	1	
Eaton.....										1		
Effingham.....										1		
Freedom.....												
Hart's Location.....												
Jackson.....										2		
Madison.....									1			
Moultonborough.....												
Ossipee.....	1											
Sandwich.....												
Tamworth.....										1		1
Tuftonborough.....									1			2
Wakefield.....	1									1		
Wolfeboro.....										1		
Total.....	2								2	9	1	3

No. 16.—*Continued.*

Counties, 1907.—International Classification.

XIII. EXTERNAL CAUSES.																	XIV. ILL-DEFINED DISEASES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
XII. OLD AGE.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
154. Senile debility.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Table

## Causes of Death arranged by Towns and

TOWNS IN MERRIMACK COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicæmia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Allenstown.....																					2	1	1						
Andover.....																					1	1							
Boscawen.....									3												5								
Bow.....					3																1								
Bradford.....																													
Canterbury.....																						2							
Chichester.....									1																				
Concord.....					1	1	2		5					1		9					27			2					
Danbury.....																					1								
Dunbarton.....																													
Epsom.....																					1								
Franklin.....	1	1			1				1					1				1			5								
Henniker.....																					1								
Hill.....																					1								
Hooksett.....	1																				3		1						
Hopkinton.....	1				1				2												1								
Loudon.....																1					2								
Newbury.....																													
New London.....													1																
Northfield.....									1							1					2								
Pembroke.....							2		1												3	1							
Pittsfield.....						1		1	1												7	1							
Salisbury.....																													
Sutton.....									1							1													
Warner.....									1																				
Webster.....	1																												
Wilmot.....																													
Total.....	4	1			5	2	4	1	17					3		12		1			166	3	5						





Table

Causes of Death arranged by Towns and

TOWNS IN MERRIMACK COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Allenstown.....	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Andover.....	..	..	2	..	..	..	8	..	..	..	..	..	..	..	..	..	..	..
Boscawen.....	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Bow.....	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..
Bradford.....	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..
Canterbury.....	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Chichester.....	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Concord.....	9	..	1	2	18	..	18	10	16	1	..	..	4	..	..	9	..	..
Danbury.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Dunbarton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Epsom.....	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
Franklin.....	2	..	..	2	4	1	2	..	..	..	..	..	..	..	..	..	..	..
Henniker.....	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Hill.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hooksett.....	1	..	1	..	2	..	..	1	..	..	..	1	..	..	..	..	..	..
Hopkinton.....	..	..	..	..	6	..	1	..	..	..	..	..	..	..	..	..	..	..
Loudon.....	2	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..
Newbury.....	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..
New London.....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Northfield.....	..	..	..	..	1	..	1	..	..	..	..	1	1	..	..	..	..	..
Pembroke.....	8	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pittsfield.....	1	..	..	..	6	..	4	..	..	..	..	..	..	..	..	1	..	..
Salisbury.....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sutton.....	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Warner.....	..	..	..	..	4	..	3	..	..	..	..	..	..	..	..	..	..	..
Webster.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Wilmot.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	28	..	3	5	69	1	34	11	17	1	1	1	6	..	..	11	..	..

No. 16.—Continued.

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...
...	1	5	...	...	1	...	...	...	...	...	...	...	1	...	4	...	...	...	...	...	...	...
...	...	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	4	...	...	...	...	...	...	...	...	...	...	2	...	3	...	...	...	...	...	...	...
...	1	3	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	6	50	6	2	5	...	...	1	...	...	1	1	2	4	32	2	4	...	...	...	...
...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	10	1	1	1	...	...	1	...	1	...	1	1	1	3	7	...	1	...	...	...	...
...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	2	1	...	...	...	...
...	...	1	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	3	...	...	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	6	1	...	...	...	...	...	...	...	...	...	...	4	...	2	7	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...
...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	5	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
2	10	112	13	2	9	...	...	3	...	1	...	2	14	8	12	85	2	7	...	...	...	...

Table

Causes of Deaths arranged by Towns and

TOWNS IN MERRIMACK COUNTY.		V. DISEASES OF THE DIGESTIVE SYSTEM.																		
		100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Allenstown.....						2	5													
Andover.....																				
Boscawen.....						1				1										
Bow.....																				
Bradford.....																				
Canterbury.....																				
Chichester.....						1				2										
Concord.....						7	3	3	3					3	1	4		4		
Danbury.....						2				1										
Dunbarton.....																				
Epsom.....																				
Franklin.....						1	1	4										1		
Henniker.....														1						
Hill.....						1														
Hooksett.....						1	2			2										
Hopkinton.....										1										
Loudon.....																				
Newbury.....																				
New London.....						1				1				1						
Northfield.....						1														
Pembroke.....							2	7		1				1				1		
Pittsfield.....								1										1		
Salisbury.....																				
Sutton.....																		1		
Warner.....										1						2				
Webster.....																				
Wilmot.....							1													
Total.....		1	1	1	19	22	4		13					7	1	9		8		1



Table

Causes of Deaths arranged by Towns and

TOWNS IN MERRIMACK COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Allenstown.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	..
Andover.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Boscawen.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bow.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....
Bradford.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Canterbury.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
Chichester.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Concord.....	2	.....	1	.....	.....	.....	.....	.....	1	15	4	.....
Danbury.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunbarton.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Epsom.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin.....	1	.....	.....	.....	1	.....	.....	.....	.....	2	3	.....
Henniker.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
Hill.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hooksett.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Hopkinton.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
Loudon.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Newbury.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New London.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Northfield.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Pembroke.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....
Pittsfield.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....
Salisbury.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sutton.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Warner.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Webster.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Wilmot.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	4	.....	1	1	1	2	.....	.....	2	35	8	1





Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Amherst.....								1	1																				
Antrim.....																													
Bedford.....							1															1							
Bennington.....									1																				
Brookline.....									1																				
Deering.....												1																	
Francestown.....																													
Goffstown.....							1		3							1						12							
Greenfield.....									1													1							
Greenville.....							1															2							
Hancock.....																						1							
Hillsborough.....	1						1									1						2							
Hollis.....									2																				
Hudson.....							1															2							
Litchfield.....									1													1							
Lyndeborough.....																						1							
Manchester.....	6			3	8	21	9	5	1	1	2	1		8					1		3	73	12	4					
Mason.....																													
Merrimack.....	1																												
Milford.....						1	2		3													1							
Mont Vernon.....																						2							
Nashua.....	1			2			9	1	3			2		1		3						32	5	1					
New Boston.....									1													1							
New Ipswich.....									2		1											2							
Pelham.....																						1							
Peterborough.....						2										1						1	1						
Sharon.....																													
Temple.....																													
Weare.....									1																				
Wilton.....					1																	2							
Windsor.....																													
Total.....	9			5	10	36	12	28		2	5			2		14			1		3	136	19	5					



Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Amherst.....	1					2												
Antrim.....						2												
Bedford.....						2		1										
Bennington.....																1		
Brookline.....						2		1										
Deering.....								1										
Francestown.....								1										
Goffstown.....	1		1	1	6	1	6		1	2			1					
Greenfield.....	1				1											1		
Greenville.....					3						2							
Hancock.....					2													
Hillsborough.....	2				3													
Hollis.....					2								1					
Hudson.....					1													
Litchfield.....					2													
Lyndeborough.....																		
Manchester.....	1	57		1	2	49	1	17	6	1	2		27			13		
Mason.....								2										
Merrimack.....	1					2												
Milford.....	2					6		1		1								
Mont Vernon.....					2													
Nashua.....	9		2	2	18		3	1	1	2			5	1		4		
New Boston.....						2												
New Ipswich.....					2													
Pelham.....																		
Peterborough.....	2				5		1											
Sharon.....																		
Temple.....						1												
Weare.....						1												
Wilton.....	2				2	1												
Windsor.....																		
Total.....	1	78	4	5	118	3	34	7	4	8		35	1		19			

No. 16.—Continued.

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	3	...	1	...	...	...	...	...	...	...	...	...	...	...	6	...	2	...	...	...	1
...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...
1	3	1	...	...	...	...	...	1	...	1	...	...	1	...	...	...	2	1	...	...	...	...
...	...	12	...	...	...	...	...	...	...	...	...	...	2	1	1	...	1	...	...	...	...	...
...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	...	...	1	...	...	...	...	...	...	...	...	1	1	1	...	...	...	...	...	...	...
...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	...	...	...	...
...	...	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	3	18	93	8	3	7	1	...	2	...	2	...	46	7	36	92	2	12	...	3	...	2
...	...	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	6	...	1	4	...	...	...	...	1	...	...	1	...	2	...	1	...	...	...	...	...
2	5	38	7	1	3	...	...	1	...	...	...	...	10	6	7	30	...	7	...	2	...	1
...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...	3	...	...	...	...	...	...
...	...	2	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	2	2	1	...	...	...	...	...	...	...	...	1	...	...	8	...	...	...	1	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	5	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	1	...	...	...	...
...	1	4	1	...	...	...	...	...	...	...	...	...	...	1	3	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	31	192	20	12	13	1	...	4	...	4	2	...	69	15	51	162	4	24	...	6	...	4

Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Amherst.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Antrim.....	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Bedford.....	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Bennington.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Brookline.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deering.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Francetown.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Goffstown.....	..	..	..	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Greenfield.....	..	..	..	2	..	2	..	2	..	..	..	..	1	..	..	..	..	..	..
Greenville.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hancock.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hillsborough.....	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	1	..
Hollis.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Hudson.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Litchfield.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lyndeborough.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Manchester.....	..	..	1	12	99	8	..	9	..	..	..	..	11	..	3	..	16	..	3
Mason.....	..	..	..	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Merrimack.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Milford.....	..	..	..	..	..	2	1	1	..	..	..	..	..	..	1	..	..	..	..
Mont Vernon.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nashua.....	..	..	1	8	36	..	..	5	..	..	..	..	3	..	3	..	1	..	..
New Boston.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
New Ipswich.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pelham.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Peterborough.....	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	1	..	..	..
Sharon.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Temple.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weare.....	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	1	..	..	..
Wilton.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..
Windsor.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tilton.....	..	..	4	24	144	10	..	27	..	..	..	..	15	..	8	..	20	..	4





Table

Causes of Death arranged by Towns and

TOWNS IN HILLSBOROUGH COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Amherst .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
Antrim .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Bedford .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	.....
Bennington .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brookline .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Deering .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Francestown .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goffstown .....	1	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....
Greenfield .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greenville .....	1	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
Hancock .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hillsborough .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....
Hollis .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Hudson .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Litchfield .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lyndeborough .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manchester .....	4	.....	3	.....	1	1	.....	.....	13	123	7	6
Mason .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Merrimack .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
Milford .....	.....	.....	.....	.....	1	.....	.....	.....	1	2	.....	.....
Mont Vernon .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nashua .....	1	.....	.....	.....	1	.....	.....	.....	2	29	3	1
New Boston .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Ipswich .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Pelham .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Peterborough .....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....
Sharon .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Temple .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Weare .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Wilton .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Windsor .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total .....	7	.....	3	.....	4	1	.....	.....	20	172	11	8

No. 16.—Continued.

Counties, 1907.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																								XIV. ILL-DEFINED DISEASES.	
154. Senile debility.		155. Suicide by poison.	156. Suicide by asphyxia.	157. Suicide by hanging or strangulation.	158. Suicide by drowning.	159. Suicide by firearms.	160. Suicide by cutting instruments.	161. Suicide by jumping from high places.	162. Suicide by crushing.	163. Other suicides.	164. Fractures.	165. Dislocations.	166. Other accidental traumas.	167. Burns and scalds.	168. Burns from corrosive substances.	169. Sunstroke.	170. Freezing.	171. Electric shock.	172. Accidental drowning.	173. Inanition (starvation).	174. Absorption of deleterious gases (non-suicidal).	175. Other acute poisonings.	176. Other external violence.	177. Dropsy.	178. Sudden death.	179. Causes of death unspecified or ill-defined.	
1	1										1		1													1	
2	2										1		1													1	
3	1																										
4	3																										
5	7																										
6	2				1					1									1								
7	1																										
8	3													1				1									
9	1																										
10	17	8	1								9		4	1				1	3		1	1	1	1		40	
11	3					2	2				1		1														
12	1																		1								
13	2																							1		2	
14	12									1	6		8	1				2	2			2	1			17	
15																										1	
16													1	2													
17	3												1														
18	1																		1								
19																											
20																											
21																											
22																											
23																											
24																											
25																											
26																											
27																											
28																											
29																											
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36																											
37																											
38																											
39																											
40																											
41																											
42																											
43																											
44																											

Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Alstead .....								1																					
Chesterfield.....																													
Dublin.....																													
Fitzwilliam.....																													
Gilsum .....																													
Harrisville .....																													
Hinsdale .....						2																							
Jaffrey .....																													
Keene.....	1						2		1																				
Marlborough.....							1		3																				
Marlow .....																													
Nelson .....																													
Richmond .....																													
Rindge .....																													
Roxbury .....																													
Stoddard .....																													
Sullivan.....																													
Surry.....																													
Swansey .....						2																							
Troy.....									2																				
Walpole.....							1		2					1															
Westmoreland .....									2																				
Winchester.....		1																											
Total.....	1	1					8	1	10					1		2						28	2						



Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro-spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alienation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nervous system.	75. Diseases of the eye.	76. Diseases of the ear.
Alstead.....	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..
Chesterfield.....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Dublin.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fitzwilliam.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Gilsum.....	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Harrisville.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hinsdale.....	..	3	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Jaffrey.....	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Keene.....	..	..	..	..	16	1	16	..	1	3	..	..	3	..	..	3	..	..
Marlborough.....	..	..	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..
Marlow.....	..	1	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Nelson.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Richmond.....	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..
Rindge.....	..	..	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..
Roxbury.....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Stoddard.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Sullivan.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Surry.....	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Swansey.....	..	..	..	..	..	..	4	..	..	..	..	1	..	..	..	..	..	..
Troy.....	..	2	..	..	1	1	1	..	..	..	..	..	3	..	..	..	..	..
Walpole.....	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..
Westmoreland.....	..	..	..	..	2	1	1	..	..	2	..	..	..	..	..	..	..	..
Winchester.....	..	2	..	1	1	1	..	..	..	..	..	..	..	1	2	..	..	..
Total.....	10	..	..	2	37	1	24	1	1	5	1	8	1	1	6	..	..	..

No. 16.—Continued.

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.												IV. DISEASES OF THE RESPIRATORY SYSTEM.											
77. Pericarditis.												90. Acute bronchitis.											
78. Acute endocarditis.												91. Chronic bronchitis.											
79. Organic diseases of the heart.												92. Broncho-pneumonia.											
80. Angina pectoris.												93. Pneumonia.											
81. Diseases of the arteries.												94. Pleurisy.											
82. Embolism and thrombosis.												95. Congestion and apoplexy of the lungs.											
83. Diseases of the veins.												96. Gangrene of the lungs.											
84. Diseases of the lymphatic system.												97. Asthma.											
85. Hemorrhages.												98. Pulmonary emphysema.											
86. Other diseases of the circulatory system.												99. Other diseases of the respiratory system.											
87. Laryngitis.																							
88. Other diseases of the larynx.																							
89. Diseases of the thyroid body.																							



Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Alstead.....				1			1												
Chesterfield.....					1														
Dublin.....							1							1					
Fitzwilliam.....																	1		
Gilsum.....																	1		
Harrisville.....						2											1		
Hinsdale.....																			
Jaffrey.....					1		1												
Keene.....					5	1	1		4	1				2				1	3
Marlborough.....	1																		
Marlow.....																			
Nelson.....					1														
Richmond.....																			
Rindge.....					1		1						1						
Roxbury.....																			
Stoddard.....																			
Sullivan.....																			
Surry.....																			
Swanzey.....						2			1										
Troy.....																			
Walpole.....						1				1									
Westmoreland.....							1												
Winchester.....						2	1												
Total.....	1	1	1	9	8	7	7	5	2		4		4		3	1	3		3



Table

Causes of Death arranged by Towns and

TOWNS IN CHESHIRE COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Alstead.....												
Chesterfield.....												
Dublin.....												
Fitzwilliam.....	1					1				3		
Gilsum.....												
Harrisville.....												
Hinsdale.....										2		
Jaffrey.....	1									8		
Keene.....	1								1	7	1	
Marlborough.....										1		2
Marlow.....										1		
Nelson.....												
Richmond.....												
Rindge.....												
Roxbury.....												
Stoddard.....									2			
Sullivan.....												
Surry.....												
Swanzey.....												
Troy.....									1	2		
Walpole.....										2		
Westmoreland.....	1											
Winchester.....										1		
Total.....	4					1			4	27	1	2

No. 16.—Continued.

Counties, 1907.—International Classification.

XII. OLD AGE.										XIII. EXTERNAL CAUSES.										XIV. ILL-DEFINED DISEASES.									
154. Senile debility.										155. Suicide by poison.										156. Suicide by asphyxia.									
157. Suicide by hanging or strangulation.										158. Suicide by drowning.										159. Suicide by firearms.									
160. Suicide by cutting instruments.										161. Suicide by jumping from high places.										162. Suicide by crushing.									
163. Other suicides.										164. Fractures.										165. Dislocations.									
166. Other accidental traumas.										167. Burns and scalds.										168. Burns from corrosive substances.									
169. Sunstroke.										170. Freezing.										171. Electric shock.									
172. Accidental drowning.										173. Inanition (starvation).										174. Absorption of deleterious gases (non-suicidal).									
175. Other acute poisonings.										176. Other external violence.										177. Dropsy.									
178. Sudden death.										179. Causes of death unspecified or ill-defined.																			

Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Acworth.....																1													
Charlestown.....	1										1											1		1					
Claremont.....	1										1					2						9							
Cornish.....																													
Croydon.....																					1								
Goshen.....																					1								
Grantham.....																													
Langdon.....																													
Lempster.....																													
Newport.....	1															2						4							
Plainfield.....																					1								
Springfield.....																													
Sunapee.....																					1								
Unity.....								1																					
Washington.....																													
Total.....	3								1		1	1				5					18			1					

Counties, 1907.—International Classification.

I. GENERAL DISEASES.—*Continued.*[illegible]



Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic* cerebro-spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions; (non-puerperal; five years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Acworth.....						1												
Charlestown.....						5												
Claremont.....	1	2		1		5		2				1						
Cornish.....		2				2												
Croydon.....						1						1						
Goshen.....								1										
Grantham.....						1												
Langdon.....						1												
Lempster.....																		
Newport.....		1				11										1		
Plainfield.....						2												
Springfield.....		1																
Sunapee.....						1												
Unity.....							1	2										
Washington.....								1										
Total.....	1	6		1		30	1	6				2				1		

No. 16.—Continued.

## Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	6	1	...	...	...	...	...	...	...	...	...	1	...	...	3	...	1	...	...	...	...
...	...	13	3	2	1	...	...	...	...	...	...	...	1	...	...	12	1	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
1	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...
...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...
...	...	8	...	...	1	...	...	...	...	...	...	...	3	...	...	5	...	...	...	...	...	...
...	...	3	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	42	5	3	2	...	...	...	...	...	...	...	7	...	...	27	1	3	...	...	...	...

Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Acworth.....																			
Charlestown.....						1	2											1	
Claremont.....					1	5		3					1						4
Cornish.....																			
Croydon.....																			
Goshen.....																			
Grantham.....					1														
Langdon.....																			
Lempster.....																			
Newport.....					2			1							1		3		
Plainfield.....								1											
Springfield...																			
Sunapee.....					1	1													1
Unity.....																			
Washington.....								1											
Total. ....					5	7	2	6					1		1		4		5

No. 16.—Continued.

Counties, 1907.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.										VII. THE PUERPERAL STATE.												
119. Acute nephritis.	120. Bright's disease.	121. Other diseases of the kidneys.	122. Calculi of the urinary tract.	123. Diseases of the bladder.	124. Diseases of the urethra.	125. Diseases of the prostate.	126. Non-venereal diseases of the male genital organs.	127. Metritis.	128. Uterine hemorrhage (non- puerperal).	129. Uterine tumor.	130. Other diseases of the uterus.	131. Cysts and other tumors of the ovary.	132. Other diseases of the fe- male genital organs.	133. Non-puerperal diseases of the breast.	134. Accidents of pregnancy.	135. Puerperal hemorrhage.	136. Other accidents of labor.	137. Puerperal septicemia.	138. Puerperal albuminuria and convulsions.	139. Phlegmasia alba dolens (puerperal).	140. Other puerperal accidents.	141. Puerperal diseases of the breast.
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Table

Causes of Death arranged by Towns and

TOWNS IN SULLIVAN COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.		XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.	150. Congenital malform- ations.	X. MALFORM- ATIONS.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Acworth.....													
Charlestown.....													
Claremont.....					1						8		
Cornish.....					1								
Croydon.....													
Goshen.....													
Grantham.....													
Langdon.....									1				
Lempster.....													
Newport.....									2	1			
Plainfield.....													1
Springfield.....													
Sunapee.....									1				
Unity.....											1		
Washington.....													
Total.....					2				4	10			1

No. 16.—Continued.

Counties, 1907.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																				XIV. ILL-DEFINED DISEASES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
154. Senile debility.		155. Suicide by poison.		156. Suicide by asphyxia.		157. Suicide by hanging or strangulation.		158. Suicide by drowning.		159. Suicide by firearms.		160. Suicide by cutting instruments.		161. Suicide by jumping from high places.		162. Suicide by crushing.		163. Other suicides.		164. Fractures.		165. Dislocations.		166. Other accidental traumas.		167. Burns and scalds.		168. Burns from corrosive substances.		169. Sunstroke.		170. Freezing.		171. Electric shock.		172. Accidental drowning.		173. Inanition (starvation).		174. Absorption of deleterious gases (non-suicidal).		175. Other acute poisonings.		176. Other external violence.		177. Dropsy.		178. Sudden death.		179. Causes of death unspecified or ill-defined.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Table

## Causes of Death arranged by Towns and

		I. GENERAL DISEASES.																												
TOWNS IN GRAFTON COUNTY.		1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Alexandria .....																	1						1							
Ashland .....										2							1						1							
Bath .....																	1						1							
Benton .....																														
Bethlehem .....																							3							
Bridgewater .....																														
Bristol .....										3							1						2							
Campton .....																							2	1						
Canaan .....																														
Dorchester .....																							1							
Easton .....																														
Ellsworth .....																														
Enfield .....										3							1						1							
Franconia .....																														
Grafton .....							1																							
Groton .....																														
Hanover .....							1	1																						
Haverhill .....		4								1					1		1						2	1						
Hebron .....																														
Holderness .....																														
Landaff .....					1																									
Lebanon .....										6		2			1								3							
Lincoln .....																							5							
Lisbon .....																							1							
Littleton .....							4											4					2							
Livermore .....																							6							
Lyman .....		1																												
Lyne .....										1													1							
Monroe .....																														
Orange .....											2																			
Orford .....																														
Piermont .....							1											1												
Plymouth .....		1								2													2	1						
Rumney .....																														
Thornton .....																														
Warren .....																														
Waterville .....																														
Wentworth .....									1																					
Woodstock .....																							1							
Total .....		6			1		2	6		21		2			2		10						39	4						



Table

Causes of Death arranged by Towns and

TOWNS IN GRAFTON COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Alexandria.....	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1	..	..
Ashland.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Bath.....	..	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Benton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Bethlehem.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Bridgewater.....	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	1	..	..
Bristol.....	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..	..	..	..
Campton.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Canaan.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Dorchester.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Easton.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Ellsworth.....	..	..	..	..	..	1	..	3	..	..	..	..	..	..	..	1	..	..
Enfield.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Franconia.....	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..
Grafton.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Groton.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Hanover.....	..	2	..	..	..	4	..	1	..	1	..	..	..	..	..	..	..	..
Haverhill.....	..	5	..	1	..	5	..	..	..	2	..	..	1	..	..	..	..	..
Hebron.....	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Holderness.....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Landaff.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Lebanon.....	..	..	..	2	..	6	..	..	..	..	..	..	1	..	..	1	..	..
Lincoln.....	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Lisbon.....	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Littleton.....	..	..	..	..	..	5	..	..	1	..	..	..	..	..	..	1	..	..
Livermore.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lyman.....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Lyme.....	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Monroe.....	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..
Orange.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Orford.....	..	1	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..
Piermont.....	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Plymouth.....	..	1	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..
Rumney.....	..	..	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..
Thornton.....	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..
Warren.....	..	..	..	..	..	1	..	1	..	..	..	1	..	..	..	..	..	..
Waterville.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wentworth.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Woodstock.....	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	1	13	..	1	2	57	..	13	1	4	..	2	2	..	..	5	..	1

No. 16.—*Continued.*

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.	
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Table

Causes of Death arranged by Towns and

TOWNS IN GRAFTON COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhoea and enteritis (under 2 years).	106. Diarrhoea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Alexandria																			
Ashland																			
Bath																			
Benton																			
Bethlehem																			
Bridgewater							1										2		
Bristol																	1		
Campton																	1		
Canaan					1	1	2												
Dorchester																			
Easton																			
Ellsworth																			
Enfield																			
Franconia														1					
Grafton																			
Groton																			
Hanover										1				1			2		2
Haverhill									1	1									1
Hebron					1										1				
Holderness									1										
Landaff						1													
Lebanon					4	4	2		1								1		2
Lincoln														1					
Lisbon										1									
Littleton																	1		
Livermore																			
Lyman																			
Lyme																			
Monroe						1													
Orange				1															
Orford																			
Piermont																			
Plymouth					1													1	
Rumney																			
Thornton						1								1					
Warren																			
Waterville																			
Wentworth																			
Woodstock																	1		
Total			1	7		9	4		3	3			4		2		11		5





Table

Causes of Death arranged by Towns and

TOWNS IN GRAFTON COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Alexandria .....												1
Ashland.....											3	
Bath .....										1		
Benton .....												
Bethlehem.....									1			
Bridgewater .....												
Bristol .....												
Campton .....											2	
Canaan .....												
Dorchester .....												
Easton .....												
Ellsworth.....												
Enfield.....												
Franconia .....												
Grafton .....											1	
Groton .....												
Hanover .....				1					1	1		1
Haverhill.....									1	2		1
Hebron .....												
Holderness.....												
Landaff.....												
Lebanon .....									1	4		2
Lincoln .....					1				1	1		
Lisbon .....									1	1		
Littleton .....										3		
Livermore .....												
Lyman .....										2		
Lyme .....	1								1			
Monroe .....												
Orange .....												
Orford .....										2		
Piermont .....												
Plymouth .....	1									2		
Rumney .....									2	2		
Thornton.....												
Warren .....												
Waterville.....												
Wentworth .....												
Woodstock .....												
Total.....	2			1	1				9	25		5



Table

Causes of Death arranged by Towns and

TOWNS IN COOS COUNTY.	I. GENERAL DISEASES.																												
	1. Typhoid fever.	4 Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicemia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.					
Berlin.....	1				2	2		1	1					1								3		1					
Cambridge.....																													
Carroll.....																													
Clarksville .....																						1							
Colebrook.....									2													2							
Columbia...																													
Dalton.....																									1				
Dummer.....																													
Errol.....																													
Gorham.....	1				1																	1							
Jefferson.....	1																												
Lancaster .....										1	1											2							
Milan.....																						2							
Millsfield .....																													
Northumberland .....	2											1																	
Pittsburg .....																						2							
Randolph.....																													
Shelburne .....																1													
Stark.....																													
Stewartstown .....														1								2							
Stratford.....	1																												
Whitefield.....	1																					4							
Total.....	7				2	3		1	4		1	1		2		1					19			2					

Counties, 1907.—International Classification.

[illegible]

Table

Causes of Death arranged by Towns and

TOWNS IN COOS COUNTY.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alien- ation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nerv- ous system.	75. Diseases of the eye.	76. Diseases of the ear.
Berlin.....	20					7	1											
Cambridge.....																		
Carroll.....						2												
Clarksville.....						1												
Colebrook.....	1					5												
Columbia.....						2												
Dalton.....							2						1					
Dummer.....																		
Errol.....																		
Gorham.....						1							1			1		
Jefferson.....								1										
Lancaster.....	2			1	3		3						1			1		
Milan.....	1				3													
Millsfield.....																		
Northumberland.....	1				5		1							1				
Pittsburg.....													1					
Randolph.....																		
Shelburne.....							1											
Stark.....																		
Stewartstown.....	1				3				1	1						1		
Stratford.....																		
Whitfield.....	1				1	2	2		1	1								
Total.....	27			1	33	4	9		2	2		4	1			3		

No. 16.—*Continued.*

Counties, 1907.—International Classification.

III. DISEASES OF THE CIRCULATORY SYSTEM.										IV. DISEASES OF THE RESPIRATORY SYSTEM.												
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
...	...	6	...	...	...	...	...	...	...	1	1	...	3	...	8	13	...	...	...	2	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	6	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...
...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	5	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	11	1	1	1	...	...	...	...	...	...	...	1	...	1	4	...	2	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	4	...	...	...	...	...	...	...	1	...	...	1	...	5	2	1	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	1	3	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	2	...	1	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...
...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	1	...
...	...	6	...	...	...	...	...	...	...	...	...	...	...	...	5	...	1	...	...	...	...	...
...	2	41	2	2	1	...	...	...	...	2	1	...	5	12	56	2	4	1	2	...	1	...



Table

Causes of Deaths arranged by Towns and

TOWNS IN COOS COUNTY.	V. DISEASES OF THE DIGESTIVE SYSTEM.																		
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under 2 years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.
Berlin.....	1	2		1	20	1									1		3		1
Cambridge.....																			
Carroll.....																			
Clarksville.....																			
Colebrook.....				1				1					1						
Columbia.....																			1
Dalton.....																			
Dummer.....																			
Errol.....																			
Gorham.....			1	1	3			1											1
Jefferson.....			1																
Lancaster.....				1	1					1			1						
Milan.....																			
Millsfield.....																			
Northumberland.....						1													1
Pittsburg.....																			
Randolph.....																			
Shelburne.....						1											2		
Stark.....																			
Stewartstown.....																			
Stratford.....								1											
Whitefield.....						1		1						1					
Total.....	1	2	2	4	27	1		4	1				2	1	1		5		4

No. 16.—Continued.

## Counties, 1907.—International Classification.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.													VII. THE PUERPERAL STATE.												
119. Acute nephritis.	120. Bright's disease.	121. Other diseases of the kidneys.	122. Calculi of the urinary tract.	123. Diseases of the bladder.	124. Diseases of the urethra.	125. Diseases of the prostate.	126. Non-venereal diseases of the male genital organs.	127. Metritis.	128. Uterine hemorrhage (non-puerperal).	129. Uterine tumor.	130. Other diseases of the uterus.	131. Cysts and other tumors of the ovary.	132. Other diseases of the female genital organs.	133. Non-puerperal diseases of the breast.	134. Accidents of pregnancy.	135. Puerperal hemorrhage.	136. Other accidents of labor.	137. Puerperal septicemia.	138. Puerperal albuminuria and convulsions.	139. Phlegmasia alba dolens (puerperal).	140. Other puerperal accidents.	141. Puerperal diseases of the breast.			
1	3	1														1									
		2																							
		1		1	1																				
																	</								

Table

Causes of Death arranged by Towns and

TOWNS IN COOS COUNTY.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the organs of locomotion.		150. Congenital malform- ations.	151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.
Berlin.....					1				2	15	2	2
Cambridge.....												
Carroll.....										2		
Clarksville.....												1
Colebrook.....										2		
Columbia.....										2		
Dalton.....												
Dummer.....									1			
Errol.....												
Gorham.....									1			1
Jefferson.....										1		
Lancaster.....	1									3	1	
Milan.....												
Millsfield.....												
Northumberland.....										1		
Pittsburg.....										1		
Randolph.....												
Shelburne.....												
Stark.....												
Stewartstown.....									1			
Stratford.....												
Whitefield.....			1						1			
Total.....	1		1		1				6	27	3	4

No. 16.—*Concluded.*

## Counties, 1907.—International Classification.

XII. OLD AGE.		XIII. EXTERNAL CAUSES.																				XIV. ILL-DEFINED DISEASES.				
154. Senile debility.		155. Suicide by poison.	156. Suicide by asphyxia.	157. Suicide by hanging or strangulation.	158. Suicide by drowning.	159. Suicide by firearms.	160. Suicide by cutting instruments.	161. Suicide by jumping from high places.	162. Suicide by crushing.	163. Other suicides.	164. Fractures.	165. Dislocations.	166. Other accidental traumas.	167. Burns and scalds.	168. Burns from corrosive substances.	169. Sunstroke.	170. Freezing.	171. Electric shock.	172. Accidental drowning.	173. Inanition (starvation).	174. Absorption of deleterious gases (non-suicidal).	175. Other acute poisonings.	176. Other external violence.	177. Dropsy.	178. Sudden death.	179. Causes of death unspecified or ill-defined.
2											1		10						1	1						5
													1													
											1			1	1								1			
	3																									
	1					1																				
	1													1					3					1		
	1																									
	2												1													
																										1
	2													2					1							1
																				</						

Table  
Recapitulation

COUNTIES.	I. GENERAL DISEASES.																											
	1. Typhoid fever.	4. Malarial fever.	5. Smallpox.	6. Measles.	7. Scarlet fever.	8. Whooping cough.	9. Diphtheria.	9a. Membranous croup.	10. Influenza.	11. Miliary fever.	13. Cholera nostras.	14. Dysentery.	14a. Epidemic dysentery.	18. Erysipelas.	19. Other epidemic diseases.	20. Purulent infection and septicæmia.	21. Glanders and farcy.	22. Malignant pustule.	23. Rabies.	24. Actinomycosis, trichinosis, etc.	26. Tuberculosis of the larynx.	27. Tuberculosis of the lungs.	28. Tubercular meningitis.	29. Abdominal tuberculosis.				
Rockingham.....	5	..	..	..	..	1	5	2	12	..	..	3	..	..	..	4	..	..	..	..	1	79	3	8				
Strafford .....	13	..	..	1	..	3	4	..	9	..	2	1	..	2	..	4	..	..	..	..	1	45	1	1				
Belknap.....	1	1	..	1	..	13	2	4	..	1	1	..	..	..	9	..	..	..	..	..	23	..	1					
Carroll.....	..	..	..	..	..	..	..	..	4	..	..	..	..	..	1	..	..	..	..	..	12	1	1					
Merrimack .....	4	1	..	..	5	2	4	1	17	..	..	..	3	..	12	..	1	..	..	1	66	3	5					
Hillsborough....	9	..	..	5	..	10	36	12	28	..	2	5	..	2	..	14	..	..	1	..	3	136	19	5				
Cheshire.....	1	1	..	..	..	8	1	10	..	..	..	..	1	..	2	..	..	..	..	..	28	2	..					
Sullivan.....	3	..	..	..	..	..	..	..	1	..	1	1	..	..	5	..	..	..	..	..	18	..	1					
Grafton .....	6	..	..	1	..	2	6	..	21	..	2	..	2	..	10	..	..	..	..	..	39	4	..					
Coös.....	7	..	..	..	2	3	..	1	4	..	1	1	..	2	..	1	..	..	..	..	19	..	2					
Total .....	49	3	..	8	7	21	76	19	110	..	9	12	..	12	..	62	..	1	1	..	6	465	33	24				

No. 16.—1907.—Continued.

by Counties.

## I. GENERAL DISEASES.—Continued.

30. Pott's disease.	1	..	..	..	..	..	..	..	..	..	19	2	3	3	2	25	..	1	1	..	13	..	2	1	6	..	1	..	..
31. Cold abscess, abscess by congestion.	..	..	..	..	2	..	..	..	..	1	8	1	..	7	1	11	..	1	1	..	7	..	..	..	6	..	..	..	..
32. White swelling.	..	..	..	..	..	..	..	..	..	..	4	2	..	2	1	7	..	..	..	..	1	..	..	..	..	..	..	..	..
33. Tuberculosis of other organs.	..	..	..	3	..	..	..	..	..	..	1	9	2	2	1	13	..	2	2	..	3	1	..	1	3	..	..	..	..
34. General tuberculosis.	1	..	..	..	1	..	1	..	..	1	20	5	2	3	2	17	1	..	3	..	9	..	1	..	8	..	6	..	..
35. Scrofula.	..	..	..	..	..	..	..	..	..	..	30	14	17	7	3	31	2	4	9	1	12	2	..	1	13	..	9	..	..
36. Syphilis.	..	..	..	..	1	2	..	..	..	4	11	1	1	3	..	6	3	6	3	..	7	..	..	..	6	2	1	..	..
37. Gonorrhea (five years and over).	..	..	..	..	..	..	1	..	..	..	4	3	3	2	1	8	1	1	1	..	3	..	..	4	..	..	..	..	..
38. Gonorrhea (under five years).	..	..	..	..	..	..	..	..	..	..	12	4	4	..	1	11	1	2	..	..	7	1	..	1	5	2	2	1	..
39. Cancer and other malignant tumors of the buccal cavity.	..	..	..	..	..	..	..	..	..	2	9	5	3	1	1	5	..	..	1	..	1	1	..	5	..	2	..	..	..
40. Cancer of stomach and liver.	11	..	..	..	..	..	..	..	..	..	126	39	35	29	12	134	8	17	21	1	63	5	3	4	57	4	23	1	..
41. Cancer of intestines.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
42. Cancer of genital organs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
43. Cancer of breast.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
44. Cancer of skin.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
45. Cancer of other or unspecified organs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
46. Tumors.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
47. Acute articular rheumatism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
48. Chronic rheumatism and gout.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
49. Scurvy.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50. Diabetes.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
51. Exophthalmic goiter.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
52. Addison's disease.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
53. Leukemia.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
54. Anemia, chlorosis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
55. Other general diseases.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
56. Acute and chronic alcoholism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
57. Chronic lead poisoning.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
59. Other chronic poisonings.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..



Table  
Recapitulation

COUNTIES.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.																	
	60. Encephalitis.	61. Simple meningitis.	61a. Epidemic cerebro - spinal meningitis.	62. Locomotor ataxia.	63. Other diseases of the spinal cord.	64. Apoplexy.	65. Softening of the brain.	66. Paralysis without specified cause.	67. General paralysis.	68. Other forms of mental alienation.	69. Epilepsy.	70. Convulsions (non-puerperal; 5 years and over).	71. Convulsions (under 5 years).	72. Tetanus.	73. Chorea.	74. Other diseases of the nervous system.	75. Diseases of the eye.	76. Diseases of the ear.
Rockingham.....	22	...	1	4	86	4	27	3	7	7	2	11	...	...	3	...	1	
Strafford.....	2	19	...	1	6	40	1	11	1	1	..	1	5	...	5	...	..	
Belknap...	1	5	...	2	1	29	2	21	..	1	1	...	1	...	2	...	..	
Carroll.....	3	...	..	3	24	4	5	2	1	..	...	1	...	...	1	...	..	
Merrimack.....	28	...	3	5	69	1	34	11	17	1	1	6	...	...	11	...	..	
Hillsborough.....	1	78	...	4	5	118	3	34	7	4	8	...	35	1	19	...	..	
Cheshire.....	10	...	..	2	37	1	24	1	1	5	1	8	..	1	6	...	..	
Sullivan.....	1	6	...	1	...	30	1	6	..	...	..	2	...	...	1	...	..	
Grafton.....	1	13	...	1	2	57	..	13	1	4	..	2	2	...	5	...	1	
Coös.....	27	...	..	1	33	4	9	..	2	2	...	4	1	..	3	...	..	
Total.....	6	211	...	13	29	523	21	184	26	38	24	9	73	2	1	56	..	2

No. 16.—1907.—*Continued.*

by Counties.

III. DISEASES OF THE CIRCULATORY SYSTEM.											IV. DISEASES OF THE RESPIRATORY SYSTEM.											
77. Pericarditis.	78. Acute endocarditis.	79. Organic diseases of the heart.	80. Angina pectoris.	81. Diseases of the arteries.	82. Embolism and thrombosis.	83. Diseases of the veins.	84. Diseases of the lymphatic system.	85. Hemorrhages.	86. Other diseases of the circulatory system.	87. Laryngitis.	88. Other diseases of the larynx.	89. Diseases of the thyroid body.	90. Acute bronchitis.	91. Chronic bronchitis.	92. Broncho-pneumonia.	93. Pneumonia.	94. Pleurisy.	95. Congestion and apoplexy of the lungs.	96. Gangrene of the lungs.	97. Asthma.	98. Pulmonary emphysema.	99. Other diseases of the respiratory system.
4	4	103	6	13	7	..	...	2	...	..	1	...	12	6	15	75	1	7	2	4	1	4
2	1	69	4	6	2	..	...	..	...	1	...	...	22	10	8	47	4	7	..	...	..	1
1	1	30	4	1	6	..	...	..	...	..	...	...	8	3	5	25	..	2	..	1	...	...
1	...	30	1	1	7	..	...	2	...	1	...	...	3	2	1	30	..	2	..	...	...	...
2	10	112	13	2	9	..	...	3	...	1	..	2	14	8	12	85	2	7	..	...	...	...
6	31	192	20	12	13	1	...	4	...	4	2	...	69	15	51	162	4	24	..	6	..	4
...	2	71	3	1	1	..	...	..	...	..	...	...	9	2	3	40	3	4	..	1	..	...
2	...	42	5	3	2	..	...	..	...	..	...	...	7	...	...	27	1	3	..	...	...	...
1	4	60	3	10	4	..	...	..	...	2	1	1	11	3	11	55	..	7	..	1	..	...
...	2	41	2	2	1	..	...	..	...	2	1	...	5	..	12	56	2	4	1	2	..	1
19	55	750	61	51	52	1	...	11	...	11	5	3	160	49	118	602	17	67	3	15	1	10

Table  
Recapitulation

COUNTIES.	V. DISEASES OF THE DIGESTIVE SYSTEM.																			
	100. Diseases of the mouth.	101. Diseases of the pharynx.	102. Diseases of the esophagus.	103. Ulcer of the stomach.	104. Other diseases of the stomach.	105. Diarrhea and enteritis (under two years).	106. Diarrhea and enteritis (2 years and over).	107. Intestinal parasites.	108. Hernia and intestinal obstructions.	109. Other diseases of the intestines.	110. Acute yellow atrophy of the liver.	111. Hydatid tumors of the liver.	112. Cirrhosis of the liver.	113. Biliary calculi.	114. Other diseases of the liver.	115. Diseases of the spleen.	116. Simple peritonitis.	117. Other diseases of the digestive system.	118. Appendicitis.	
Rockingham.....	1	3	11	30	8	5	1	..	..	8	..	6	..	7	..	4	..	4	..	
Strafford.....	..	2	17	41	2	..	9	1	..	3	2	6	..	4	..	1	..	1	..	
Belknap.....	..	2	10	8	1	..	3	2	..	1	..	1	..	2	..	2	..	2	..	
Carroll.....	..	1	5	1	1	..	3	..	..	2	..	..	..	2	..	1	..	1	..	
Merrimack.....	1	1	19	22	4	..	13	..	..	7	1	9	..	8	..	1	..	1	..	
Hillsborough.....	..	4	24	144	10	..	27	..	..	15	..	8	..	20	..	4	..	4	..	
Cheshire.....	1	1	9	8	7	..	5	2	..	4	..	3	..	1	3	..	3	..	3	..
Sullivan.....	..	..	5	7	2	..	6	..	..	1	..	1	..	4	..	5	..	5	..	
Grafton.....	..	1	7	9	4	..	3	3	..	4	..	2	..	11	..	5	..	5	..	
Coös.....	1	2	2	4	27	1	..	4	1	..	2	1	1	..	5	..	4	..	4	..
Total.....	4	2	17	111	297	40	..	78	10	..	47	4	34	..	66	1	30	..	30	..

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by Counties.

VI. DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.														VII. THE PUERPERAL STATE.									
119. Acute nephritis.  120. Bright's disease.  121. Other diseases of the kidneys.  122. Calculi of the urinary tract.  123. Diseases of the bladder.  124. Diseases of the urethra.  125. Diseases of the prostate.  126. Non-venereal diseases of the male genital organs.  127. Metritis.  128. Uterine hemorrhage (non-puerperal).  129. Uterine tumor.  130. Other diseases of the uterus.  131. Cysts and other tumors of the ovary.  132. Other diseases of the female genital organs.  133. Non-puerperal diseases of the breast.														134. Accidents of pregnancy.  135. Puerperal hemorrhage.  136. Other accidents of labor.  137. Puerperal septicemia.  138. Puerperal albuminuria and convulsions.  139. Phlegmasia alba dolens (puerperal).  140. Other puerperal accidents.  141. Puerperal diseases of the breast.									
4	52	2	5	1					1									2					
4	82		3	2				1	2									1	1		2		
5	17		1	2					1														
...	17	1																1					
5	53		5	2					2		1				1						2		
8	101	5	1	5				2	2	1	1				2		4	5		4			
5	28		2	1					2			1				1	2						
1	26	1	1	1									1			1							
5	44		3	1	1			1		2		1			1	1	1						
1	17	1	1	1	1										1		1						
38	387	10	2	26	1	11		4	9	4	2	2		1	4	10	11			8			

Table  
Recapitulation

COUNTIES.	VIII. DISEASES OF THE SKIN AND CELLULAR TISSUE.				IX. DISEASES OF THE ORGANS OF LOCOMOTION.				X. MALFORM- ATIONS.	XI. EARLY INFANCY.		
	142. Gangrene.	143. Carbuncle.	144. Acute abscess, phlegmon.	145. Other diseases of the skin.	146. Diseases of the bones.	147. Diseases of the joints.	148. Amputation.	149. Other diseases of the or- gans of locomotion.		151. Congenital debility, icterus and sclerema.	152. Other diseases peculiar to early infancy.	153. Lack of care.
Rockingham.....	4	1	.....	1	.....	.....	1	.....	5	29	1	1
Strafford.....	2	.....	.....	.....	.....	.....	.....	.....	5	24	5	1
Belknap.....	2	.....	.....	.....	.....	.....	.....	.....	.....	11	.....	.....
Carroll.....	2	.....	.....	.....	.....	.....	.....	.....	2	9	1	3
Merrimack.....	4	.....	1	1	1	2	.....	.....	2	35	8	1
Hillsborough.....	7	.....	3	.....	4	1	.....	.....	20	172	11	8
Cheshire.....	4	.....	.....	.....	.....	1	.....	.....	4	27	1	2
Sullivan.....	.....	.....	.....	.....	2	.....	.....	.....	4	10	.....	1
Grafton.....	2	.....	.....	1	1	.....	.....	.....	9	25	.....	5
Coös.....	1	.....	1	.....	1	.....	.....	.....	6	27	3	4
Total.....	28	1	5	3	9	4	1	.....	57	369*	30	26

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by Counties.

		XII. OLD AGE.		XIII. EXTERNAL CAUSES.																				XIV. ILL-DEFINED DISEASES.																													
		154. Senile debility.		155. Suicide by poison.		156. Suicide by asphyxia.		157. Suicide by hanging or strangulation.		158. Suicide by drowning.		159. Suicide by firearms.		160. Suicide by cutting instruments.		161. Suicide by jumping from high places.		162. Suicide by crushing.		163. Other suicides.		164. Fractures.		165. Dislocations.		166. Other accidental traumas.		167. Burns and scalds.		168. Burns from corrosive substances.		169. Sunstroke.		170. Freezing.		171. Electric shock.		172. Accidental drowning.		173. Inanition (starvation).		174. Absorption of deleterious gases (non-suicidal).		175. Other acute poisonings.		176. Other external violence.		177. Dropsy.		178. Sudden death.		179. Causes of death unspecified or ill-defined.	
41	..	..	..	..	..	4	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	6	2	..	1	..	1	7	..	..	..	..	2	1	1	..	..	..	..	15											
37	2	..	1	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	8	10	..	1	..	..	3	..	..	..	..	..	1	1	1	..	..	..	..	13											
36	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	3	..	..	..	..	..	2	..	..	..	..	..	..	8											
17	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	5	1	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	7											
61	..	..	1	..	2	..	..	..	..	..	..	3	7	..	7	4	..	2	..	..	..	7	..	4	..	2	..	..	8	..	1	1	3	3	1	..	..	..	..	..	..	14											
64	3	1	1	1	4	2	..	..	..	..	2	18	..	20	5	..	..	..	2	8	..	1	3	2	2	..	..	8	..	1	3	2	2	..	..	..	..	..	..	..	70												
26	..	..	..	1	..	..	..	..	..	..	6	..	4	3	..	..	..	..	..	6	..	1	2	3	..	..	..	6	..	1	2	3	..	..	..	..	..	..	..	..	3												
17	..	..	..	1	..	..	..	..	..	..	4	..	6	..	..	..	..	..	..	3	..	..	..	..	..	..	..	3	..	..	..	..	1	..	..	..	..	..	..	2													
51	..	..	2	..	3	2	..	..	..	..	6	..	37	2	..	..	..	..	..	5	..	..	3	..	2	..	..	5	..	..	3	1	1	..	..	..	..	..	..	13													
19	..	..	..	1	2	..	..	..	..	..	2	..	17	1	..	..	..	..	1	3	..	..	1	..	..	..	..	5	..	..	..	1	1	..	..	..	..	..	..	11													
369	5	2	5	4	19	6	..	..	..	5	54	..	113	28	..	4	..	4	51	..	3	10	15	12	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	156												

\* Premature births (born living) 200.



Table No. 17.  
Deaths by Ages, Sex and Months, by Counties and Towns, 1907.  
(Not including still births.)

TOWNS IN ROCKINGHAM COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Atkinson	Males.....	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	4	9
	Females.....	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	3	3	1	1	1	5	
Auburn	Males.....	1	2	1	1	1	1	1	1	1	1	2	2	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	9	18
	Females.....	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	9	
Brentwood	Males.....	1	1	2	1	1	1	1	1	7	6	6	1	1	1	1	2	4	4	1	2	1	2	2	1	5	1	1	25	37
	Females.....	2	1	1	1	1	1	4	1	2	2	2	1	1	1	2	1	1	2	1	1	1	1	2	1	1	1	1	12	
Candia	Males.....	1	1	1	1	1	1	1	1	4	3	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	9	20
	Females.....	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	1	2	2	1	2	2	2	2	2	2	2	2	11	
Chester	Males.....	2	1	1	1	1	1	1	1	2	6	1	1	1	1	2	1	2	2	2	1	1	1	2	1	2	2	2	14	21
	Females.....	1	1	1	1	1	1	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	7	
Danville	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	10
	Females.....	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	5	
Deerfield	Males.....	2	1	1	1	1	1	1	1	2	3	2	1	1	1	1	1	3	1	3	1	3	2	1	1	1	1	1	12	27
	Females.....	2	1	1	1	1	1	3	3	3	3	2	1	1	1	3	3	1	1	3	3	3	1	2	1	1	1	1	15	
Derry	Males.....	4	1	1	5	5	3	3	3	3	3	4	2	1	1	6	3	1	3	3	2	2	4	2	4	3	4	4	33	66
	Females.....	6	1	3	1	5	2	4	1	3	4	2	1	1	5	5	3	1	3	3	2	1	1	4	2	5	7	7	33	
East Kingston	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1	2	7
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1	5	

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Epping .....	Males.....	3	1	2	2	2	2	1	.....	.....	.....	3	1	1	2	.....	.....	1	2	1	.....	11
	Females.....	1	.....	2	3	2	.....	.....	.....	.....	.....	2	.....	3	.....	2	.....	.....	2	1	.....	22
Exeter.....	Males.....	5	3	1	2	6	2	5	8	6	8	.....	.....	3	4	7	3	5	2	5	3	41
	Females.....	4	2	1	2	3	6	7	4	5	4	5	.....	1	5	3	4	5	1	2	5	37
Fremont.....	Males.....	1	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	1	.....	.....	.....	.....	1	.....	.....	4
	Females.....	1	.....	2	2	.....	.....	.....	1	2	1	.....	.....	1	.....	1	.....	.....	1	1	.....	9
Greenland.....	Males.....	1	.....	.....	.....	.....	.....	.....	1	2	2	.....	.....	2	.....	.....	.....	1	.....	1	.....	5
	Females.....	1	.....	2	.....	1	.....	.....	1	2	3	.....	.....	2	.....	1	.....	2	.....	1	.....	9
Hampstead.....	Males.....	1	.....	1	2	1	2	4	5	.....	.....	.....	.....	1	3	4	.....	1	.....	1	.....	16
	Females.....	.....	.....	.....	3	2	2	.....	.....	.....	.....	.....	.....	1	3	.....	1	.....	1	.....	.....	7
Hampton.....	Males.....	.....	1	3	.....	.....	.....	.....	3	1	.....	.....	.....	1	3	.....	.....	.....	.....	1	.....	8
	Females.....	.....	.....	1	1	1	3	3	.....	3	3	.....	.....	.....	1	2	1	.....	.....	3	1	9
Hampton Falls.....	Males.....	1	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	3
	Females.....	2	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....	4
Kensington.....	Males.....	.....	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
	Females.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	8
Kingston.....	Males.....	.....	.....	.....	1	1	.....	.....	2	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	4
	Females.....	.....	.....	1	2	.....	2	1	1	2	2	1	.....	1	1	2	1	.....	1	.....	2	12
Londonderry.....	Males.....	1	.....	1	3	4	2	7	8	.....	.....	.....	.....	2	.....	3	2	1	1	2	3	21
	Females.....	2	.....	1	1	1	.....	1	1	.....	.....	.....	.....	.....	1	2	.....	1	1	1	.....	8
Newcastle.....	Males.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
	Females.....	.....	.....	.....	2	1	.....	.....	2	1	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	3
Newfields.....	Males.....	1	.....	.....	.....	2	.....	.....	1	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	1	.....	5
	Females.....	.....	.....	1	.....	4	1	1	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	2	.....	7
Newington.....	Males.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
	Females.....	.....	.....	.....	.....	1	.....	.....	2	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	4
Newmarket.....	Males.....	8	7	1	1	5	2	4	1	.....	2	.....	.....	1	3	1	.....	1	5	1	3	32
	Females.....	7	1	1	3	.....	1	2	4	7	1	1	.....	3	4	3	.....	2	2	2	.....	29



[illegible]TOWNS IN  
STRAFFORD COUNTY.[illegible]

Table No. 17.—1907.—Continued.

TOWNS IN STRAFFORD COUNTY. —Continued.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Middleton.....	Males.....	1	1	1	1	1	1	1	2	3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	7	7
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	11
Milton.....	Males.....	2	1	1	1	1	1	1	1	5	1	5	1	1	1	1	4	2	1	3	1	1	2	1	2	2	2	2	19	19
	Females.....	1	1	1	1	1	1	1	1	2	4	6	1	1	1	2	4	1	2	2	2	1	2	1	2	2	2	2	15	34
New Durham.....	Males.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	4	4
	Females.....	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	5	9
Rochester.....	Males.....	16	3	1	2	2	4	3	3	2	9	4	1	1	1	2	6	3	6	3	8	1	4	1	6	6	4	1	50	50
	Females.....	17	5	2	4	2	4	6	10	10	10	6	1	1	1	7	11	4	4	3	9	3	4	10	7	1	4	1	67	117
Rollinsford.....	Males.....	7	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	4	2	1	1	2	6	1	1	1	1	20	20
	Females.....	3	4	1	1	1	1	1	1	3	3	2	1	1	1	1	2	1	1	3	4	1	1	1	1	1	5	1	18	38
Somersworth.....	Males.....	18	5	2	3	1	4	2	4	4	8	4	1	1	1	3	8	5	7	5	6	3	3	8	5	3	1	1	58	58
	Females.....	15	1	1	3	3	6	5	3	6	6	4	1	1	1	7	5	3	5	4	2	3	2	2	4	5	5	1	46	104
Strafford.....	Males.....	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	9	12
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	12
Total.....	Males.....	74	17	6	14	13	20	22	30	36	58	36	4	1	1	5	44	32	28	23	29	20	26	27	30	23	18	1	335	335
	Females.....	59	17	2	9	20	20	24	32	42	65	31	5	1	1	5	42	22	32	31	28	23	27	26	25	21	17	1	331	666

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TOWNS IN BELKNAP COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Alton.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	7	9	
	Females.....	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	1	...	1	...	...	...	...	2	...	...	16	
Barnstead.....	Males.....	1	1	1	1	1	1	1	1	3	1	6	3	1	1	1	1	2	1	2	5	1	...	1	2	1	...	6	22	
	Females.....	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	1	1	...	...	2	...	...	...	...	...	...	
Belmont.....	Males.....	2	...	...	...	...	...	1	1	...	2	1	...	...	...	1	1	1	...	...	1	...	1	1	2	...	7	13		
	Females.....	1	...	...	...	...	...	1	1	1	3	1	...	...	...	2	1	...	1	1	1	1	1	2	...	1	...	6	...	
Center Harbor.....	Males.....	...	2	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	1	...	1	...	3	4	
	Females.....	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	
Gilford.....	Males.....	1	1	...	...	...	...	...	1	2	4	...	...	...	...	2	...	1	2	...	1	1	...	1	1	1	...	9	17	
	Females.....	1	...	...	...	...	1	...	...	...	4	2	...	...	1	...	3	1	...	1	1	1	...	...	...	...	...	8	...	
Gilmanton.....	Males.....	1	...	...	...	...	...	1	2	1	1	1	...	...	...	...	1	1	3	...	2	...	1	...	1	...	...	6	16	
	Females.....	1	1	1	1	1	1	1	...	...	...	...	1	1	...	...	1	1	1	...	...	1	...	...	...	...	...	...	...	
Laconia.....	Males.....	16	5	8	6	1	2	7	9	21	12	1	...	...	...	8	2	10	7	12	8	2	8	6	7	5	8	...	83	164
	Females.....	11	3	4	3	2	8	8	9	20	9	1	...	...	...	10	11	9	6	6	5	4	6	5	4	7	8	...	81	...
Meredith.....	Males.....	1	1	1	1	1	1	3	2	5	2	...	...	...	...	3	1	1	3	2	1	...	1	1	3	...	1	...	17	40
	Females.....	...	...	...	...	...	1	3	2	6	5	5	1	...	...	8	1	...	2	1	...	...	1	3	2	3	...	23	...	
New Hampton.....	Males.....	3	...	...	...	...	...	...	1	4	2	1	...	...	...	...	5	1	1	1	...	...	2	1	...	1	...	11	15	
	Females.....	...	...	2	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	4	...	
Sanbornton.....	Males.....	1	1	1	...	...	1	...	...	1	...	1	...	...	...	...	3	2	...	1	...	...	...	...	...	2	...	5	14	
	Females.....	1	...	...	1	1	1	...	...	2	2	1	...	...	...	...	...	2	...	...	1	1	...	...	...	...	...	...	9	...
Tilton.....	Males.....	1	1	1	...	...	...	2	9	6	3	...	...	...	...	4	2	...	4	2	...	1	1	4	3	1	2	...	24	44
	Females.....	1	1	3	2	...	...	3	1	8	1	...	...	...	...	4	2	3	1	1	2	2	...	1	1	...	3	...	20	...
Total.....	Males.....	26	8	3	7	9	3	5	15	26	53	25	8	...	...	19	13	18	20	19	17	6	16	14	17	11	13	188	358	
	Females.....	13	6	4	8	7	15	17	22	45	24	5	1	...	...	25	18	19	18	10	11	11	9	12	9	15	18	...	176	









## DEATHS.

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[illegible]









## DEATHS.

285

TOWNS IN CHESHIRE COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Alstead.....	Males.....	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	8	13
	Females.....	1	1	1	1	1	1	1	1	1	2	1	1	1	4	1	1	1	1	1	1	1	1	1	2	2	8	13	
Chesterfield...	Males.....	1	1	1	1	1	1	1	1	1	4	2	1	1	1	1	1	1	1	2	2	1	1	1	2	2	7	5	12
	Females.....	1	1	1	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	5	7	
Dublin.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Fitzwilliam.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	14
	Females.....	4	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	2	2	2	1	1	1	11	11	
Gilsom.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	3	5	8
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	8	
Harrisville.....	Males.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	4	4	8
	Females.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	4	8	
Hinsdale.....	Males.....	5	1	1	1	1	1	1	1	1	3	1	1	1	3	2	1	3	3	1	1	1	2	1	2	2	15	15	27
	Females.....	1	1	1	1	1	1	1	1	1	3	2	1	1	2	1	1	3	3	1	1	1	2	1	1	2	12	12	
Jaffrey.....	Males.....	4	2	1	1	1	1	1	3	1	3	1	1	1	3	3	2	2	2	1	1	2	2	2	1	1	15	15	
	Females.....	6	1	1	1	1	1	1	2	3	1	1	1	1	2	2	4	2	2	1	1	2	2	2	2	1	14	14	
	Not stated...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	
Keene.....	Males.....	7	2	1	6	4	5	7	13	20	6	1	1	1	8	5	8	8	10	11	3	6	3	1	7	3	73	73	180
	Females.....	11	1	4	7	6	6	15	12	25	15	4	1	1	20	8	9	8	7	5	1	7	11	9	11	11	107	107	
Marlborough.....	Males.....	7	2	2	1	1	1	1	2	1	4	1	1	1	2	2	3	2	1	1	2	1	3	2	3	2	22	22	31
	Females.....	1	3	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	9	9	
Marlow.....	Males.....	1	1	1	1	1	1	1	1	2	2	1	1	1	4	2	1	1	1	2	1	1	1	1	1	1	9	9	20
	Females.....	1	1	1	1	1	2	1	2	2	1	1	1	1	4	1	1	1	1	2	1	1	1	1	1	1	11	11	
Nelson.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	Females.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	
Richmond.....	Males.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6
	Females.....	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	5	5	
Rindge.....	Males.....	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	8	8	14
	Females.....	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	6	14	

Table No. 17.—1907.—*Continued.*

TOWNS IN CHESHIRE COUNTY. —Continued.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.	
Roxbury.....	Males.....																				1								1	1	
	Females.....							1																							
Stoddard.....	Males.....	2					1												1						2				3	6	
	Females.....	1										2				1								2							
Sullivan.....	Males.....																														
	Females.....	1										2				1										1			2	1	3
Surry.....	Males.....							1	1															2					2	2	
	Females.....																														
Swansey.....	Males.....	3	4					1			1	2						1		1	1			5	1	2			11	22	
	Females.....	1	1					2	1	3	2			2				1	1	2	1		1	2					11		
Troy.....	Males.....	6	1		2				1			1							2	1	4	1		2			1		12	25	
	Females.....	3	1	1	1					2	3		1			1	3	2	1			2		2		2			13		
Walpole.....	Males.....	2	1	2	3			3		3	3	4	1			2	4	2		2	3	1	2	3	2	1			22		
	Females.....	1	3	1	1					3	1	1	2			1	1	1		2		1	2	2	2	4			14	36	
Westmoreland.....	Males.....		1	1	1				2	2	8	5				2	2	2			3	2	1	3	1	3	2		21	27	
	Females.....										3	1	2			1	3					1							6		
Winchester.....	Males.....	2	2	1				1	5	3	2	1				3		2	2	2		1	3	1	2		1		17	34	
	Females.....	1	1	1	4				1			3				1	2	1	2	5	1	1			1	1			17		
Total.....	Males.....	41	14	9	7	14	12	13	25	30	58	28	5	1	35	26	19	21	21	21	25	15	14	29	15	19	18	257			
	Females.....	31	8	7	12	19	14	11	26	28	58	36	13	1	45	28	21	21	21	21	15	10	15	31	14	20	25	266			
	Not stated..	1	1																				1						1	524	

TOWNS IN  
SULLIVAN COUNTY.

TOWNS IN SULLIVAN COUNTY.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.	
Acworth.....	Males.....							1	1		2	1			1		2	2			1					1		3	4	7
	Females.....											2																		
Charlestown.....	Males.....	1	1				2	1	1	4	2	3	2		5		1			1		4		3	1	2		17	15	32
	Females.....	2	2	1	1	1	1	1	1	3	2	2				1	2	2	2	1	2	1	2	1	2	1				
Claremont.....	Males.....	11	1	2	2	4	1	5	5	9	19	5			8	5	7	5	5	4	4	5	9	5	4	3		64	59	123
	Females.....	6	4	1	3	2	4	7	7	11	6	6	2		3	4	4	5	8	5	5	4	9	2	6	4				
Cornish.....	Males.....	1						2	2	2		1				1	2		2	1		1		2	1		8	5	13	
	Females.....		1						1	2	1				1															
Croydon.....	Males.....					1					2								2						1		4	1	5	
	Females.....								1			1						1												
Goshen.....	Males.....									1	1	1				1				1		1				1	3	3	8	
	Females.....	1	1	1	1	1	1	1	1		1	1				1	1	1				2								
Grantham.....	Males.....	1							1		1	1							1	1		1	1	1			4	2	6	
	Females.....					1						1						1			1									
Langdon.....	Males.....	1	1								2		1			1	1				1		1		1		5	2	7	
	Females.....									1	1				1	1														
Lempster.....	Males.....								1							1											2	1	3	
	Females.....																1													
Newport.....	Males.....	3	1	2	4	2	1	2	3	8	3	4	1		2	3	3	3	5	1	2	1	2	7	1	1	34	25	59	
	Females.....	3		2	2	2	1	6	4	5				1	2	1	2	4	1	3	2	5	1	4	2					
Plainfield.....	Males.....	1							1		3	4			1	1	1		1	1	1	2	1	1	1		9	3	12	
	Females.....									2										1										

DEATHS.



[illegible]



## REGISTRATION REPORT.

Table No. 17.—1907.—Continued.

TOWNS IN GRAFTON COUNTY. —Continued.		Under 1	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
Hanover.....	Males.....	4	2	2	5	1	6	3	6	3	...	...	...	...	...	5	4	3	3	3	3	2	...	5	6	...	1	...	32	60
	Females.....	2	...	...	3	2	4	1	6	3	1	...	...	...	...	3	2	1	1	4	2	2	3	2	3	3	2	...	28	
Haverhill.....	Males.....	6	1	...	4	4	5	4	7	2	...	...	...	...	...	4	3	5	5	1	6	1	4	...	2	1	1	...	33	70
	Females.....	4	4	2	2	3	3	5	5	4	3	1	...	1	...	2	6	2	4	5	...	5	2	3	5	2	1	...	37	
Hebron.....	Males.....	1	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	1	...	...	...	1	1	...	...	...	...	...	3	4
	Females.....	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	
Holderness.....	Males.....	...	...	...	...	...	1	3	2	3	...	...	...	...	...	1	...	...	1	3	1	...	...	1	...	1	...	...	9	17
	Females.....	...	...	...	...	2	1	4	1	...	...	...	...	...	...	...	1	...	...	1	...	1	2	2	...	...	1	...	8	
Landaff.....	Males.....	1	1	...	1	1	...	1	...	1	...	...	...	...	...	1	...	...	...	...	...	1	1	2	...	...	...	...	6	12
	Females.....	2	...	...	1	1	...	2	...	...	...	...	...	...	...	1	...	1	1	...	...	1	1	1	...	...	1	...	6	
Lebanon.....	Males.....	7	8	2	2	2	2	2	6	11	4	1	...	...	...	1	4	6	4	6	2	2	3	1	1	5	7	...	43	86
	Females.....	7	...	1	2	2	1	7	7	7	8	1	...	...	...	9	1	4	4	3	3	2	3	4	8	5	2	...	43	
Lincoln.....	Males.....	3	...	1	2	1	1	...	1	...	1	...	...	...	...	1	2	...	...	1	...	...	2	1	...	2	2	...	11	12
	Females.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	
Lisbon.....	Males.....	1	...	...	...	...	4	2	5	1	...	...	...	...	...	...	...	1	1	2	2	1	1	3	...	3	...	...	14	31
	Females.....	1	...	1	2	...	2	1	1	4	5	...	...	...	...	1	2	3	2	2	1	...	...	...	3	2	1	...	17	
Littleton.....	Males.....	2	1	4	2	5	1	2	5	5	1	...	...	...	...	3	1	2	4	2	1	2	6	1	4	4	...	...	30	53
	Females.....	5	8	1	2	3	2	1	1	1	3	...	...	...	...	6	3	2	2	2	1	2	...	2	2	...	1	...	23	
Livermore....	Males.....	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	1
	Females.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	
Lyman.....	Males.....	2	...	1	...	...	...	...	...	1	1	...	1	...	...	...	...	1	...	...	2	...	...	...	...	2	1	...	6	9
	Females.....	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	1	...	...	...	1	...	...	1	...	...	...	...	3	



## REGISTRATION REPORT.

Table No. 17.—1907.—Continued.

TOWNS IN COOS COUNTY.		Under 1.										Over 100.	Unknown.	January.										August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
		1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.			90 to 100.																	
Berlin	Males.....	33	12	2	6	11	1	7	9	6	2	1	...	1	4	5	9	9	8	6	7	10	4	9	11	9	...	91	157		
	Females.....	31	14	4	3	3	4	...	1	2	1	...	...	10	7	6	4	5	4	5	7	5	2	5	6	...	66				
Cambridge	Males.....	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...		
	Females.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...			
Carroll	Males.....	1	1	...	...	...	...	1	3	1	...	...	...	...	...	2	1	1	1	1	...	...	1	...	1	...	7	...			
	Females.....	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...			
Clarksville	Males.....	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	1	...			
	Females.....	1	...	...	1	1	...	...	...	1	...	...	...	...	...	...	...	1	1	...	...	...	...	...	1	...	4	...			
Colebrook	Males.....	2	1	...	2	2	1	...	5	5	3	...	...	2	2	2	...	3	1	2	2	2	2	3	1	...	22	34			
	Females.....	2	...	...	...	...	...	1	...	7	2	...	...	1	2	3	1	1	1	1	1	1	1	...	...	...	12				
Columbia	Males.....	2	1	...	...	...	...	...	1	1	...	...	...	1	1	...	...	2	...	...	...	...	...	...	1	...	5	10			
	Females.....	2	1	...	1	1	...	1	...	...	...	...	...	1	1	...	...	...	...	...	...	3	1	...	...	...	5				
Dalton	Males.....	1	...	1	...	...	1	...	1	2	...	...	...	...	1	2	1	...	...	1	...	...	...	...	1	...	6	11			
	Females.....	1	...	...	...	1	1	...	1	1	2	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	5				
Dummer	Males.....	2	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	1	1	...	...	...	...	...	...	...	3	3			
	Females.....	2	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	1	1	...	...	...	...	...	...	...	...				
Errol	Males.....	...	...	...	...	1	...	...	...	1	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	2	2			
	Females.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...				
Gorham	Males.....	5	1	...	1	1	1	...	5	2	1	...	...	1	2	...	2	2	2	...	1	2	4	3	1	...	18	30			
	Females.....	4	2	1	1	1	...	1	1	2	...	...	2	...	2	...	2	2	2	1	...	...	...	...	...	...	12				

[illegible]

Table

Recapitulation, Deaths by Ages, Sex.

COUNTIES.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.
Rockingham .....	Males.....	55	24	4	12	24	37	34	46	77	98	65
	Females.....	54	8	8	10	24	30	33	47	61	83	65
	Not stated.....											
Strafford.....	Males.....	74	17	6	14	13	20	22	30	36	58	36
	Females.....	59	17	2	9	20	20	24	32	42	65	31
	Not stated.....											
Belknap .....	Males.....	26	8	3	7	9	3	5	15	26	53	25
	Females.....	13	6	4	8	8	7	15	17	22	45	24
	Not stated.....											
Carroll.....	Males.....	17	1	1	2	9	5	6	7	20	36	29
	Females.....	12	2	1	4	3	7	9	13	21	36	23
	Not stated.....											
Merrimack .....	Males.....	69	17	6	18	26	38	41	65	85	92	63
	Females.....	65	20	10	14	20	24	40	37	75	105	53
	Not stated.....											
Hillsborough.....	Males.....	313	93	21	31	53	73	93	93	138	132	82
	Females.....	255	71	31	39	58	83	75	99	134	145	82
	Not stated.....	5										
Cheshire.....	Males.....	41	14	9	7	14	12	13	25	30	58	28
	Females.....	31	8	7	12	19	14	11	26	28	58	36
	Not stated.....	1										
Sullivan.....	Males.....	20	7	4	7	10	4	13	17	29	40	22
	Females.....	12	7	1	3	7	9	11	11	24	26	24
	Not stated.....											
Grafton.....	Males.....	51	12	2	12	19	26	22	31	60	72	34
	Females.....	41	11	3	9	24	29	26	29	42	59	56
	Not stated.....											
Coös.....	Males.....	60	24	4	16	23	6	20	21	43	36	14
	Females.....	49	17	8	7	9	18	13	12	18	35	16
	Not stated.....											
Total.....	Males.....	726	217	60	126	200	224	269	350	544	675	398
	Females.....	591	167	75	115	192	241	257	323	467	657	410
	Not stated.....	11										
Grand total.....		1323	384	135	241	392	465	526	673	1011	1332	808

No. 17.—*Concluded.*

and Months, by Counties, 1907.\*

90 to 100.	Over 100.	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	Total.	Grand total.
8 19	.... ....	3 3	40 43	44 45	56 44	32 45	46 31	30 29	29 23	44 38	43 31	40 45	53 28	30 43	.... ....	487 445	932
4 5	.... ....	5 5	35 37	44 42	32 22	28 32	23 31	29 28	20 23	26 27	27 26	30 25	23 21	18 17	.... ....	335 331	
3 5	.... ....	.... 1	19 25	13 18	18 19	20 18	19 10	17 11	6 11	16 9	14 12	17 9	11 15	13 18	.... ....	183 175	358
1 6	.... ....	2 1	13 19	8 13	15 17	10 15	9 13	12 8	11 13	6 9	13 6	19 11	9 8	11 6	.... ....	136 138	
5 9	1 ....	5 2	61 52	54 40	47 52	33 42	60 43	42 43	43 29	43 34	37 35	44 29	36 39	31 36	.... ....	531 474	1,005
9 11	.... 1	3 3	120 115	101 83	122 104	92 103	89 86	76 84	97 85	104 98	86 88	68 82	94 72	85 87	.... ....	1,134 1,087	
5 13	.... 1	1 2	35 45	26 28	19 21	21 21	21 21	25 15	15 10	14 15	29 31	15 14	19 20	18 25	.... ....	257 266	524
4 2	1 ....	.... 9	18 9	17 13	19 9	12 13	14 17	12 9	11 13	19 11	16 17	21 5	11 13	8 8	.... ....	178 137	
4 19	.... ....	8 5	31 39	37 31	29 36	34 24	29 28	22 22	27 27	24 25	33 39	26 29	26 21	35 32	.... ....	353 353	706
9 2	.... ....	2 4	24 21	19 16	31 12	24 19	26 20	21 16	16 21	26 23	18 15	26 14	25 17	16 14	.... ....	272 208	
46 91	2 2	29 26	396 405	363 329	388 336	306 332	336 300	286 265	275 255	322 289	316 300	306 269	307 254	265 286	.... ....	3,866 3,614	7,486
....	....	....	1	....	....	....	....	1	2	1	1	....	....	....	....	6	
137	4	55	802	692	724	638	636	552	532	612	617	569	561	551	....	7,486	

\* Not including still births.











Table No. 18.—1907.—Continued.

Sex.	MONTHS.												WHOLE NUMBER.		AGES.																
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.	Males.	Females.	Unknown.	Under 1.	1 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Unknown.		
	Unknown.	December.	November.	October.	September.	August.	July.	June.	May.	April.	March.	February.																		January.	
CAUSES OF DEATH.																															
V. DISEASES OF THE DIGESTIVE SYSTEM.																															
M.	69	40	38	30	29	18	7	4	8	18	19	29	602	309	298	..	42	22	5	5	5	14	20	30	24	46	66	29	1		
F.	55	44	34	37	24	15	7	6	13	13	20	25	..	..	..	..	30	25	6	4	9	12	16	17	23	43	62	45	1		
M.	1	2	1	1	1	1	1	1	1	1	1	1	17	13	4	..	..	4	1	..	3	1	1	1	1	1	1	1	..		
F.	1	1	1	1	1	1	1	1	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
M.	4	1	4	3	2	3	3	3	5	1	5	..	67	84	33	..	5	1	..	1	..	2	3	2	6	7	7	..	..		
F.	3	4	3	4	4	2	1	3	5	2	2	..	..	..	..	..	7	6	1	..	1	..	..	..	2	9	4	1	..		
M.	1	1	..	..	..	..	..	..	..	..	..	..	3	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
F.	1	1	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
M.	1	1	1	1	1	1	1	1	1	1	2	..	15	7	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
F.	1	1	1	1	1	1	1	1	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
M.	1	1	1	1	1	1	1	1	1	1	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
F.	2	..	1	..	..	..	..	..	..	..	..	..	10	6	4	..	1	..	..	..	..	..	..	..	..	..	..	..	..		
V. DISEASES OF THE DIGESTIVE SYSTEM.																															
M.	2	..	1	..	..	..	..	..	..	..	..	1	4	4	..	..	1	1	1	1	..	..	..	..	..	..	..	..	..		
F.	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
M.	2	1	1	1	1	1	1	1	1	1	1	1	2	2	..	..	..	..	..	..	..	..	..	2	..	2	3	..	..		
F.	1	1	1	2	1	1	1	1	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
M.	3	2	3	3	7	4	5	2	4	5	5	5	111	46	65	..	10	5	..	..	2	2	1	1	1	1	4	8	7	8	1
F.	3	5	6	3	3	4	11	10	5	4	5	4	..	..	..	..	15	5	..	..	..	..	..	..	2	4	2	3	10	13	11
M.	2	4	5	2	4	7	24	56	39	17	6	4	297	170	127	..	152	18	..	..	..	..	..	..	..	..	..	..	..	..	
F.	1	1	3	1	5	19	42	30	13	6	3	..	..	..	..	..	122	5	..	..	..	..	..	..	..	..	..	..	..	..	
M.	1	1	1	2	2	2	3	2	3	2	1	2	40	16	24	..	4	1	1	1	1	1	1	1	1	2	1	5	..	..	
F.	2	1	2	2	2	2	3	2	3	2	1	1	..	..	..	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	



[illegible]

## VII. THE PUERPERAL STATE.

[illegible]





## XII. OLD AGE.

M..	20	26	11	11	7	11	12	15	13	11	17	..	369	174	195	..	..	..	..	..	..	..	2	755	110	..
F..	30	19	18	13	12	10	12	12	23	15	13	..	..	..	..	..	..	..	..	..	..	..	1	747	138	2

## 154. Senile debility.

## Senile debility.

## XIII. EXTERNAL CAUSES.

M..	1	..	..	..	1	..	..	..	..	..	..	..	5	3	2	..	..	..	..	..	..	1	1	..	..
F..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	1	..	..	..	1	..	..	..	..	..	..	..	2	1	1	..	..	..	..	..	..	1	1	..	..
F..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	1	..	..	..	2	..	..	..	..	..	..	..	5	3	2	..	..	..	..	..	..	1	1	..	..
F..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	1	..	..	..	1	..	..	..	..	..	..	..	4	3	1	..	..	..	..	..	..	1	1	..	..
F..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	1	1	1	2	1	2	4	..	1	4	2	..	19	19	..	..	..	..	..	..	..	1	3	3	2
M..	1	..	..	..	..	..	..	..	..	..	..	..	6	4	2	..	..	..	..	..	..	1	2	..	2
F..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	1	..	..	..	1	..	..	..	1	1	..	..	5	4	1	..	..	..	..	..	..	1	1	..	1
F..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	3	1	4	4	1	5	4	..	2	3	7	5	54	39	15	..	..	..	..	..	..	2	3	6	7
F..	2	3	1	1	3	1	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	1	3	5
M..	4	7	8	7	5	2	8	20	14	5	4	..	113	88	25	..	..	..	..	..	..	4	8	10	18
F..	1	..	1	1	2	1	1	14	1	1	2	..	..	..	..	..	..	..	..	..	..	1	2	5	4
M..	5	1	1	3	1	..	..	..	..	..	..	..	28	11	17	..	..	..	..	..	..	3	2	4	1
F..	2	2	1	1	..	1	..	2	1	2	3	2	..	..	..	..	..	..	..	..	..	1	2	1	2
M..	..	..	..	..	..	..	..	..	..	..	..	..	4	2	2	1	..	..	..	..	..	..	..	..	..
F..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M..	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
F..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M..	1	..	..	..	2	4	8	14	6	3	1	..	51	46	5	..	..	..	..	..	..	1	5	14	10
F..	1	..	..	..	1	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	2
M..	1	..	..	..	1	..	..	..	..	..	..	..	3	2	1	..	..	..	..	..	..	1	..	..	..
F..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M..	1	2	1	1	..	1	1	1	1	1	1	..	10	7	3	..	..	..	..	..	..	2	1	1	1
F..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M..	1	1	1	1	1	1	1	1	1	1	1	..	15	8	7	3	1	1	1	1	1	1	1	1	1
F..	2	1	1	1	1	1	1	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

## XIV. ILL-DEFINED DISEASES.

M..	2	3	1	..	..	..	..	..	2	1	..	..	12	10	2	..	..	..	..	..	..	1	..	..	4	3	2	..
F..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
M..	1	..	..	..	1	..	..	..	..	..	..	..	2	..	2	..	..	..	..	..	..	1	..	..	..	..	1	..
F..	9	9	8	5	5	7	7	11	7	7	6	..	156	88	68	..	..	..	..	..	..	37	7	1	3	3	5	13
M..	7	9	6	4	8	5	3	6	10	5	3	2	..	..	..	..	..	..	..	..	..	36	3	1	..	2	2	3
F..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6

## 177. Dropsy.

## Dropsy.

## 178. Sudden death.

## Sudden death.

## 179. Causes of death unspecified or ill-defined.

## Causes of death unspecified or ill-defined.

# SUMMARY OF VITAL STATISTICS.

Table No. 19.  
Population of Counties in 1880, 1890, and 1900.

Counties.	1880.	1890.	1900.
Rockingham.....	49,064	49,650	51,118
Strafford.....	35,558	38,442	39,337
Belknap.....	17,948	20,321	20,321
Carroll.....	18,224	18,124	16,895
Merrimack.....	46,300	49,435	52,430
Hillsborough.....	75,634	93,247	112,640
Cheshire.....	28,734	29,579	31,321
Sullivan.....	18,161	17,304	18,009
Grafton.....	38,788	37,217	40,844
Cooks.....	18,580	23,211	29,468
Total.....	346,991	376,530	411,588

The above table shows the population by counties according to the United States census for 1880, 1890, and 1900. It is from these figures that our calculations are made in arriving at the estimated population for each year as given in Table No. 24. The calculation is made upon the assumption that the increase between the respective decennial periods was constant. This would, doubtless, approximate very closely the exact population for each. At least it would be near enough to give correct percentages to an exceedingly small fraction. Percentages when given by years (excepting for census years) are based upon deductions made in the manner just stated.

Table No. 20.  
Population of New Hampshire by Age Periods, Census Years, 1880, 1890, and 1900.

Ages.	1880.	1890.	1900.
1 to 10.....	60,803	61,033	73,695
10 to 20.....	62,724	68,363	67,617
20 to 30.....	63,252	68,672	73,992
30 to 40.....	46,532	53,533	60,334
40 to 50.....	39,344	42,946	49,598
50 to 60.....	31,998	35,032	37,856
60 to 70.....	23,417	25,447	27,280
70 to 80.....	14,227	14,972	15,132
Over 80.....	4,694	5,469	4,956
Age unknown.....		1,063	1,128
Total.....	346,991	376,530	411,588

Table No. 21.—Births.  
Showing Births from 1880 to 1907, inclusive.

Counties.	Births.																											
	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Rockingham.....	733	675	749	692	637	640	757	727	750	752	773	764	797	895	806	859	857	871	899	884	866	917	850	947	895	977	1043	1005
Strafford.....	322	423	625	698	640	621	662	701	725	705	784	814	808	861	799	853	866	883	913	867	856	838	816	820	810	843	938	842
Belknap.....	215	227	273	261	242	256	263	296	307	328	322	370	395	353	403	361	388	328	325	295	305	317	312	330	336	354	370	417
Carroll.....	153	198	274	286	275	245	264	249	236	250	261	279	309	312	318	304	280	328	270	276	260	270	242	282	259	261	284	249
Merrimack.....	628	750	809	723	739	734	818	773	852	921	938	1032	988	1069	1107	1010	1018	986	980	1001	967	1023	994	938	1040	997	1010	989
Hillsborough.....	840	879	1617	1675	1813	1952	2148	2313	1798	1923	1963	2144	2286	2489	2207	2529	2768	2697	2600	2378	2832	2446	2651	2641	2587	2722	2838	2951
Cheshire.....	255	348	445	496	554	511	514	525	553	546	543	602	611	665	558	622	578	551	597	647	578	607	645	605	606	625	610	645
Sullivan.....	245	236	265	269	268	267	230	269	276	287	306	309	339	312	309	337	285	304	302	290	309	327	323	303	314	370	329	366
Grafton.....	584	593	657	647	643	631	623	623	599	695	636	658	618	720	667	720	705	729	729	727	724	713	687	722	761	790	841	758
Cooks.....	274	286	410	403	406	462	378	434	347	495	420	538	595	672	686	657	689	782	706	753	738	706	729	730	756	843	871	861
Total.....	4219	4615	6124	6150	6247	6319	6657	6910	6443	6912	6946	7510	7746	8348	7860	8252	8434	8459	8321	8118	8435	8164	8249	8318	8364	8782	9234	9083

Since 1893 still births and premature births have been excluded from this table. They will be found elsewhere.

Table No. 22.—Marriages.  
Showing Number of Marriages from 1880 to 1907, inclusive, by Years.

Counties.	Popu- lation			Marriages.																											
	1880.	1890.	1900.	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Rockingham...	49,064	49,650	51,118	310	382	419	389	419	447	440	457	420	484	458	507	502	546	459	545	535	503	489	512	561	514	585	525	459	499	603	604
Stafford .....	35,558	38,442	39,837	255	332	428	425	415	388	418	420	416	377	457	466	466	407	471	472	482	455	426	439	413	405	391	418	362	464	503	499
Belknap.. ....	17,948	20,321	19,526	108	177	166	198	147	150	183	213	183	186	178	200	208	194	192	208	177	152	168	176	183	157	168	219	176	200	197	189
Carroll.....	18,224	18,124	16,895	136	149	159	175	171	182	177	149	163	176	155	200	190	205	174	177	191	160	170	162	148	156	138	162	157	155	144	167
Merrimack....	46,300	49,435	52,430	330	353	364	432	344	361	345	421	405	423	473	430	463	478	446	426	437	414	457	419	471	448	431	415	410	478	423	467
Hillsborough..	75,634	93,247	112,640	752	674	1025	949	886	815	876	915	879	1013	939	1043	1252	1138	1017	1095	1130	1080	1022	957	1098	1092	1142	1201	1133	1202	1294	1290
Cheshire .....	28,734	29,579	31,321	195	206	232	262	238	233	240	255	221	250	237	289	269	255	265	263	257	237	255	270	275	325	268	263	282	315	293	314
Sullivan.....	18,161	17,304	18,009	134	151	149	167	138	109	140	123	146	154	172	175	152	151	153	156	142	150	155	149	167	153	191	154	158	176	214	207
Grafton .....	38,788	37,217	40,844	274	270	319	339	332	327	318	328	322	343	314	338	332	356	401	406	365	350	385	380	369	400	401	357	379	392	396	451
Coös.....	18,580	23,211	29,468	135	146	172	149	202	168	187	214	224	215	238	256	240	300	303	267	316	275	266	277	298	321	336	290	287	331	311	358
Total.....	346,991	376,530	411,588	2625	2830	3433	3495	3292	3180	3324	3495	3379	3621	3621	3904	4074	4090	3881	4015	4032	3776	3793	3741	3983	4001	4061	4004	3803	4212	4378	4546

Table No. 23.—Deaths.  
Showing Deaths from 1880 to 1907, inclusive.

Counties.	Deaths.																											
	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Rockingham .....	627	717	732	699	873	911	963	876	896	875	1065	991	1026	1033	901	910	876	912	844	875	866	917	879	857	816	993	878	932
Strafford .....	184	329	372	494	627	619	609	673	688	691	801	809	864	742	617	624	675	719	707	729	856	838	597	636	660	711	671	666
Belknap .....	147	153	219	262	285	289	362	369	392	389	374	392	440	369	381	338	346	332	347	356	305	317	338	377	322	357	407	358
Carroll .....	107	189	219	253	333	269	303	294	328	298	303	341	342	305	299	297	284	282	277	290	260	270	261	278	244	278	269	274
Merrimack .....	595	695	726	762	736	796	833	835	920	891	983	951	1064	1063	953	930	887	872	827	914	967	1023	856	949	944	941	997	1005
Hillsborough .....	1203	1396	1390	1551	1655	1701	1681	1697	1846	1740	1973	1957	2092	2103	1902	1980	2024	2046	1899	1990	2832	2446	2039	1977	1923	2283	2303	2226
Cheshire .....	240	271	405	418	497	494	475	482	488	525	557	482	608	595	514	512	438	479	499	523	578	607	435	458	535	508	495	524
Sullivan .....	190	261	261	254	273	284	328	283	327	314	332	280	382	362	326	316	285	315	306	272	309	327	270	312	275	291	289	315
Grafton .....	429	482	487	547	652	611	616	602	655	625	651	648	749	696	698	681	634	689	638	662	724	713	611	678	634	622	744	706
Cooks .....	107	157	190	181	263	227	256	368	314	348	329	459	421	395	367	341	342	381	399	434	738	706	363	447	451	415	445	480
Total .....	3826	4650	5001	5421	6194	6201	6426	6479	6854	6696	7368	7310	7988	7663	6898	6929	6791	7027	6743	7045	8435	8164	6649	6969	6804	7339	7498	7486

Since 1898 still births and premature births have been excluded from this table. They will be found elsewhere.



Table No. 24.

Births, Marriages and Deaths, with the Population and Rates, for 1884 to 1907, inclusive.

Years.	Population.*	Births.	Marriages.	Deaths.	Birth-rate per 1,000.	Persons married to 1,000.	Death-rate per 1,000.
1884.....	358,845	6,247	3,292	6,194	17.40	18.34	17.26
1885.....	361,806	6,319	3,180	6,201	17.46	17.56	17.13
1886.....	364,767	6,657	3,324	6,426	18.24	18.22	17.61
1887.....	367,728	6,910	3,495	6,479	18.78	19.00	17.61
1888.....	370,689	6,443	3,379	6,854	17.38	18.22	18.48
1889.....	373,650	6,912	3,621	6,696	18.49	19.36	17.91
1890.....	376,530	6,946	3,621	7,368	18.44	19.22	19.56
1891.....	379,896	7,510	3,904	7,310	19.77	20.55	19.24
1892.....	383,292	7,746	4,074	7,988	20.21	21.26	20.84
1893.....	386,719	8,348	4,090	7,663	21.58	21.15	19.81
1894.....	390,177	7,860	3,881	6,898	20.14	19.89	17.68
1895.....	393,665	8,252	4,015	6,929	20.96	20.39	17.60
1896.....	397,185	8,434	4,032	6,791	21.23	20.30	17.09
1897.....	400,737	8,459	3,776	7,027	21.11	18.86	17.55
1898.....	404,322	8,321	3,793	6,743	20.58	18.76	16.68
1899.....	407,938	8,118	3,741	7,045	19.90	18.33	17.27
1900.....	411,588	8,435	3,983	7,624	20.49	19.35	18.52
1901.....	415,238	8,164	4,001	6,975	19.66	19.27	16.79
1902.....	418,888	8,249	4,061	6,649	19.69	19.39	15.87
1903.....	422,538	8,318	4,004	6,969	19.68	18.95	16.49
1904.....	426,188	8,364	3,803	6,804	19.62	17.84	15.94
1905.....	429,838	8,782	4,212	7,339	20.43	19.59	17.07
1906.....	433,488	9,234	4,378	7,498	21.30	20.19	17.29
1907.....	437,138	9,083	4,546	7,486	20.77	20.79	17.12

\* Population estimated excepting for census years.

Table No. 25.

Population of 1900; Births, Marriages and Deaths, with rates of each to 1,000 of the population, for the year ending December 31, 1906.

Counties.	Population in 1900.	Births.	Rate per 1,000 of population.	Marriages.	Rate per 1,000 of population.	Deaths.	Rate per 1,000 of population.
Rockingham.....	51,118	1,043	20.40	603	11.79	878	17.17
Strafford.....	39,337	938	23.84	503	12.78	671	17.05
Belknap.....	19,526	370	18.94	197	10.08	407	20.84
Carroll.....	16,895	284	16.80	144	8.52	269	15.92
Merrimack.....	52,430	1,010	19.26	423	8.06	997	19.01
Hillsborough.....	112,640	2,938	26.08	1,294	11.48	2,303	20.44
Cheshire.....	31,321	610	19.47	293	9.35	495	15.80
Sullivan.....	18,009	329	18.17	214	11.88	289	15.95
Grafton.....	40,844	841	20.59	396	9.68	744	18.21
Coös.....	29,468	871	29.55	311	10.55	445	15.10
Total.....	411,588	9,234	22.43	4,378	10.63	7,498	18.21

Table No. 26.

Population of 1900; Births, Marriages and Deaths, with rates of each to 1,000 of the Population, for the year ending December 31, 1907.

Counties.	Population in 1900.	Births.	Rate per 1,000 of population.	Marriages.	Rate per 1,000 of population.	Deaths.	Rate per 1,000 of population.
Rockingham.....	51,118	1,005	19.66	604	11.81	932	18.23
Strafford.....	39,337	842	21.40	499	12.68	666	16.93
Belknap.....	19,526	417	21.35	189	9.67	358	18.33
Carroll.....	16,895	249	14.73	167	9.88	274	16.21
Merrimack.....	52,430	989	18.86	467	8.90	1,005	19.16
Hillsborough.....	112,640	2,951	26.19	1,290	11.45	2,226	19.76
Cheshire.....	31,321	645	20.59	314	10.02	524	16.72
Sullivan.....	18,009	366	20.32	207	11.49	315	17.48
Grafton.....	40,844	758	18.55	451	11.04	706	17.28
Coös.....	29,468	861	29.21	358	12.14	480	16.28
Total.....	411,588	9,083	22.06	4,546	11.04	7,486	18.18

Table No. 27.

Percentage of American and Foreign Births, by Counties, 1906.

Counties.	Parents.			Births with parent-age not stated.
	American born.	Foreign born.	One foreign born.	
Rockingham.....	55.12	24.64	17.64	27
Strafford.....	37.73	45.30	16.52	14
Belknap.....	51.89	25.94	20.00	8
Carroll.....	78.52	6.33	12.32	8
Merrimack.....	51.38	28.11	18.51	20
Hillsborough.....	26.61	52.75	18.89	51
Cheshire.....	53.44	26.06	18.36	13
Sullivan.....	62.91	19.11	15.50	8
Grafton.....	62.09	13.91	21.28	23
Coös.....	26.75	49.02	22.04	19
Total for state.....	42.59	36.77	18.56	191

Table No. 28.

Percentage of American and Foreign Births, by Counties, 1907.

Counties.	Parents.			Births with parent-age not stated.
	American born.	Foreign born.	One foreign born.	
Rockingham.....	54.32	27.16	16.31	22
Strafford.....	38.95	44.89	14.72	12
Belknap.....	54.19	23.74	19.18	12
Carroll.....	76.70	7.22	13.25	7
Merrimack.....	51.06	27.80	19.71	14
Hillsborough.....	25.92	53.54	18.67	55
Cheshire.....	53.64	26.66	17.05	17
Sullivan.....	61.20	21.03	16.39	5
Grafton.....	63.72	13.58	20.05	20
Coös.....	26.48	47.73	23.80	17
Total for state.....	42.29	37.27	18.43	181

## MARRIAGES.

Table No. 29.

Marriage Rates for 1882 to 1907, inclusive.\*

Years.	Marriages.	Persons married to 1,000 living.	Number living to one married.
1882.....	3,433	19.44	103
1883.....	3,495	19.68	102
1884.....	3,292	18.34	109
1885.....	3,180	17.56	114
1886.....	3,324	18.22	109
1887.....	3,495	19.00	105
1888.....	3,379	18.22	109
1889.....	3,621	19.36	103
1890.....	3,621	19.22	103
1891.....	3,904	20.55	97
1892.....	4,074	21.26	93
1893.....	4,090	21.15	94
1894.....	3,881	19.89	100
1895.....	4,015	20.39	98
1896.....	4,032	20.30	97
1897.....	3,776	18.86	106
1898.....	3,793	18.76	106
1899.....	3,741	18.33	107
1900.....	3,983	19.85	103
1901.....	4,001	19.27	104
1902.....	4,061	19.39	103
1903.....	4,004	18.95	105
1904.....	3,803	17.84	112
1905.....	4,212	19.59	102
1906.....	4,378	20.19	99
1907.....	4,546	20.79	90

\* Population estimated for all but census years.

Table No. 30.  
Marriage Rates for 1882 to 1907, inclusive, by Counties.

Counties.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Rockingham.....	8.51	8.09	8.49	9.04	8.89	9.22	8.45	9.72	9.22	10.21	10.08	10.96	9.24	10.98	10.77	10.13	9.85	10.31	10.97	10.64	11.63	10.27	8.97	9.76	11.79	11.81
Strafford . . . . .	11.84	11.66	11.30	10.48	11.21	11.17	10.98	9.88	11.88	12.12	11.94	11.88	12.25	12.28	12.54	11.84	11.08	11.42	10.49	10.29	9.94	10.63	9.20	11.79	12.78	12.65
Belknap.....	9.01	10.61	7.78	7.84	9.45	10.87	9.23	9.27	8.75	9.84	10.00	9.22	9.44	10.23	8.71	7.48	8.26	8.66	9.37	8.04	8.60	11.22	9.01	10.24	10.08	9.67
Carroll.....	8.73	9.62	9.40	10.01	9.74	8.21	8.98	9.71	8.55	11.03	10.43	11.33	9.60	9.77	10.54	8.83	9.38	8.93	8.76	9.23	8.17	9.58	9.29	9.17	8.52	9.88
Merrimack.....	7.75	9.14	7.23	7.54	7.16	8.68	8.30	8.61	9.56	8.69	9.24	9.46	9.02	8.62	8.84	8.37	9.24	8.48	8.98	8.54	8.22	7.91	7.81	9.11	8.06	8.90
Hillsborough.....	12.95	11.73	10.72	9.65	10.17	10.41	9.80	11.08	10.07	11.18	12.93	10.15	10.91	11.74	12.12	11.58	10.96	10.26	9.74	9.69	10.14	10.66	10.05	10.67	11.48	11.45
Cheshire.....	8.01	9.02	8.01	7.97	8.18	8.66	7.48	8.43	8.01	9.77	9.04	8.55	8.95	8.89	8.69	8.01	8.62	9.13	8.78	10.38	8.55	8.39	9.00	10.05	9.35	10.02
Sullivan.....	8.28	9.27	7.74	6.14	7.93	7.00	8.85	8.86	9.93	10.11	8.44	8.85	8.84	9.01	8.21	8.67	8.95	8.61	9.27	8.49	10.61	8.55	8.77	9.77	11.88	11.49
Grafton.....	8.28	8.83	8.68	8.59	8.38	8.68	8.55	9.15	8.43	9.10	8.62	9.69	10.77	10.91	9.81	9.40	10.34	10.21	9.03	9.79	9.82	8.74	9.27	9.59	9.68	11.04
Cook's.....	8.82	7.46	9.89	8.04	8.76	9.82	10.07	9.47	10.25	11.03	9.94	12.19	13.05	11.50	13.61	11.85	11.46	11.98	10.11	10.89	11.40	9.78	9.74	11.23	10.55	12.14
Average.....	9.72	9.84	9.17	8.78	9.11	9.50	9.11	9.68	9.61	10.31	10.58	10.56	10.21	10.39	10.38	9.61	9.81	9.79	9.55	9.59	9.86	9.73	9.23	10.23	10.63	11.04

Table No. 31.

Marriages According to Nativity.—Percentages, 1882 to 1907, inclusive.

Years.	Both American.	Both foreign.	Groom American, foreign bride or not stated.	Bride American, foreign groom or not stated.	Not stated.	American-born persons.	Foreign-born persons.
1882.....	65.74	12.09	5.13	4.14	12.90	80.80	19.20
1883.....	66.15	12.62	5.38	4.18	11.67	80.30	19.70
1884.....	69.44	12.91	5.32	3.92	8.41	80.86	19.14
1885.....	69.75	11.57	4.97	4.84	8.87	81.92	18.08
1886.....	67.87	13.39	6.50	5.08	7.16	79.34	20.66
1887.....	65.72	15.79	6.07	5.49	6.93	76.82	23.16
1888.....	64.22	17.16	7.10	6.31	5.21	74.82	25.18
1889.....	64.32	17.04	7.40	6.55	4.69	74.80	25.20
1890.....	62.19	18.58	7.53	7.15	4.53	65.14	34.86
1891.....	62.45	18.49	7.38	6.74	4.94	73.13	26.87
1892.....	59.82	21.01	7.81	6.82	4.54	70.33	29.67
1893.....	60.88	18.80	10.68	8.09	1.54	71.37	28.63
1894.....	62.12	17.34	8.32	8.25	3.97	73.32	26.68
1895.....	60.87	17.86	12.05	8.55	.67	71.65	28.35
1896.....	60.37	18.27	11.71	9.05	.60	71.17	28.83
1897.....	60.59	18.69	11.39	8.69	.64	71.08	28.92
1898.....	60.88	18.19	11.47	8.78	.68	71.49	28.51
1899.....	60.52	15.96	11.36	9.65	.51	73.40	26.60
1900.....	60.68	18.43	10.75	9.64	.50	71.23	28.77
1901.....	61.46	17.75	10.70	9.72	.37	71.94	28.06
1902.....	62.32	16.84	10.42	10.02	.40	72.83	27.17
1903.....	59.59	18.93	10.58	10.38	.52	70.44	29.56
1904.....	60.71	18.49	10.57	9.78	.45	71.24	28.79
1905.....	59.83	18.80	11.02	10.21	.14	70.54	29.46
1906.....	59.37	17.56	12.15	10.44	.48	71.00	29.00
1907.....	60.99	18.35	10.65	9.72	.28	71.39	28.61

The above table of percentages is interesting in that it shows the fluctuations in the nativity of couples and individuals married during the past twenty-four years. An increasing accuracy of details in the returns of marriages is shown in the "Not stated" column in the fact that a reduction from nearly thirteen per cent. to a small fraction of one per cent. has been attained in that period.

The last two columns of the table apply only to the persons whose nativity was given in the returns, the "Not stated" figures being excluded.



Table No. 32.—

## Divorces Decreed from 1870 to 1907,

Counties.	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886
Rockingham.....	19	20	29	34	41	23	37	18	30	30	44	30	23	21	28	25	40
Strafford .....	12	6	24	27	25	17	20	29	29	34	58	42	36	53	32	28	46
Belknap.....	.....	7	7	13	12	10	18	16	16	16	22	17	14	15	19	20	24
Carroll. ....	4	1	1	9	9	4	10	13	19	13	11	19	9	7	14	20	12
Merrimack.....	15	27	32	13	51	37	40	23	22	36	41	25	49	49	48	35	46
Hillsborough....	64	37	58	51	77	75	65	73	61	69	83	87	90	74	93	86	110
Cheshire. ....	12	19	19	16	15	22	21	17	18	22	31	21	34	25	30	25	32
Sullivan.....	6	6	10	16	17	13	26	9	10	8	9	22	17	12	11	20	25
Grafton.....	13	21	15	29	22	20	20	29	17	27	25	37	27	14	28	22	30
Coös.....	4	5	2	4	12	11	9	10	11	10	15	7	15	3	12	10	17
Total.....	149	149	197	212	281	232	266	237	233	265	339	307	314	273	315	291	382

## Divorces.

inclusive, by Counties.

1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
41	26	43	42	47	33	42	34	60	47	39	57	52	43	59	62	63	72	55	49	75
24	41	36	38	30	30	39	38	35	37	45	40	32	37	34	47	37	26	31	37	37
25	26	27	25	37	27	25	28	23	38	25	23	35	36	42	39	26	27	38	43	39
12	22	20	20	17	18	20	20	25	25	21	17	16	23	22	29	20	29	23	19	18
48	49	42	53	52	55	53	50	56	35	47	65	51	63	77	50	58	61	55	44	78
78	82	87	95	115	89	108	109	99	118	115	120	108	107	95	111	144	127	119	129	139
26	29	31	32	32	32	28	29	28	29	33	34	28	30	35	32	37	48	31	28	30
20	26	18	22	13	8	15	17	19	11	25	23	28	22	29	30	28	29	29	32	25
35	40	39	33	49	38	39	47	46	43	48	40	56	45	60	58	73	73	59	63	56
16	18	25	22	20	17	29	26	16	23	31	26	29	20	29	25	32	33	31	31	25
325	359	368	382	412	347	398	398	407	406	429	445	435	426	482	483	518	525	471	475	522

Table No. 33.  
Causes upon which Divorces Have Been Decreed for Twenty-Six Years, 1882 to 1907, inclusive, by Counties.

Counties.	Absent three years.		Abandonment.		Abandonment and adultery.		Abandonment and willing ab- sence.		Absent three years and aban- donment.		Adultery.		Conviction of crime and im- prisonment.		Desertion and bigamy.		Desertion.		Extreme cruelty.		Extreme cruelty and abandon- ment.		Extreme cruelty and adultery.		Extreme cruelty and habitual drunkenness.		Absence of wife from state ten years together.		Extreme cruelty, habitual drunkenness and adultery.		Habitual drunkenness and adultery.		Habitual drunkenness and treatment injurious to health.		Habitual drunkenness and de- section.		Impotency.		Joining religious sect and re- fusal to cohabit.		Willing absence and refusal to cohabit.		Nullity.		Prior marriage.		Refusal to cohabit.		Treatment injurious to health.		Treatment injurious to health and extreme cruelty.		Treatment injurious to reason.		Willing absence three years.		No cause assigned.		Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	3	437	.....	.....	.....	.....	216	8	.....	.....	302	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table No. 34.

Ratio of Divorces to Marriages from 1882 to 1907,  
inclusive.\*

Years.	Number of marriages.	Person married to 1,000.	Number of Divorces.	Ratio of divorces to marriages.
1882.....	3,433	19.44	314	1 to 10.93
1883.....	3,495	19.68	273	1 to 12.80
1884.....	3,292	18.34	315	1 to 10.45
1885.....	3,180	17.56	291	1 to 10.92
1886.....	3,324	18.22	382	1 to 8.70
1887.....	3,495	19.00	325	1 to 10.75
1888.....	3,379	18.22	386	1 to 8.75
1889.....	3,621	19.36	368	1 to 9.83
1890.....	3,621	19.22	382	1 to 9.48
1891.....	3,904	20.55	412	1 to 10.55
1892.....	4,074	21.26	347	1 to 11.74
1893.....	4,090	21.15	338	1 to 10.27
1894.....	3,881	19.89	398	1 to 9.75
1895.....	4,015	20.39	407	1 to 9.86
1896.....	4,032	20.30	406	1 to 9.93
1897.....	3,776	18.86	429	1 to 8.80
1898.....	3,793	18.76	445	1 to 8.52
1899.....	3,741	18.33	435	1 to 8.60
1900.....	3,983	19.35	426	1 to 9.35
1901.....	4,001	19.27	482	1 to 8.30
1902.....	4,061	19.39	483	1 to 8.41
1903.....	4,004	18.95	518	1 to 7.73
1904.....	3,803	17.84	525	1 to 7.24
1905.....	4,212	19.59	471	1 to 8.94
1906.....	4,378	20.19	475	1 to 9.21
1907.....	4,546	20.79	522	1 to 8.70

\*Population estimated for all but census years.

Table No. 34 gives the ratio of marriages to divorces for the years mentioned. Tables showing the alleged causes of divorce may be found elsewhere in this report.

Table No. 35.

Ratio of Divorces to Marriages, by Counties, for 1906.

Counties.	Number of marriages.	Number of divorces.	Ratio of divorces to marriages.
Rockingham.....	603	49	1 to 12.30
Strafford.....	503	37	1 to 13.59
Belknap.....	197	43	1 to 45.81
Carroll.....	144	19	1 to 7.57
Merrimack.....	423	44	1 to 9.61
Hillsborough.....	1,294	129	1 to 10.03
Cheshire.....	293	28	1 to 10.46
Sullivan.....	214	32	1 to 6.68
Grafton.....	396	63	1 to 6.28
Coös.....	311	31	1 to 10.03
Total.....	4,378	475	1 to 9.21

Table No. 36.

Ratio of Divorces to Marriages, by Counties, for 1907.

Counties.	Number of marriages.	Number of divorces.	Ratio of divorces to marriages.
Rockingham.....	604	75	1 to 8.05
Strafford.....	499	37	1 to 13.48
Belknap.....	189	39	1 to 4.84
Carroll.....	167	18	1 to 9.27
Merrimack.....	467	78	1 to 5.98
Hillsborough.....	1,290	139	1 to 9.28
Cheshire.....	314	30	1 to 10.46
Sullivan.....	207	25	1 to 8.28
Grafton.....	451	56	1 to 8.05
Coös.....	358	25	1 to 14.32
Total.....	4,546	522	1 to 8.70

## DEATHS.

Table No. 37.

Deaths and Death Rates from 1884 to 1907, inclusive.

Years.	Deaths registered.	Deaths to 1,000 of population.*	Population.*
1884.....	6,194	17.26	358,845
1885.....	6,201	17.13	361,806
1886.....	6,426	17.61	364,767
1887.....	6,479	17.61	367,728
1888.....	6,854	18.48	370,689
1889.....	6,696	17.91	373,650
1890.....	7,368	19.56	376,530
1891.....	7,310	19.24	379,896
1892.....	7,988	20.84	382,292
1893.....	7,663	19.81	386,719
1894.....	6,898	17.68	390,177
1895.....	6,929	17.60	393,665
1896.....	6,791	17.09	397,185
1897.....	7,027	17.53	400,737
1898.....	6,743	16.68	404,322
1899.....	7,045	17.27	407,938
1900.....	7,624	18.52	411,588
1901.....	6,975	16.79	415,238
1902.....	6,649	15.87	418,888
1903.....	6,969	16.49	422,538
1904.....	6,804	15.94	426,188
1905.....	7,339	17.07	429,838
1906.....	7,498	17.29	433,488
1907.....	7,486	17.12	437,138

\* Population estimated for all but census years.



Table No. 38.  
Deaths and Death Rates by Counties, from 1884 to 1907, inclusive.

Counties.	1884.		1885.		1886.		1887.		1888.		1889.		1890.		1891.		1892.		1893.		1894.		1895.	
	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.
Rockingham..	873	17.69	911	18.43	963	19.46	876	17.67	896	18.05	875	17.61	1,065	21.45	991	19.95	1,026	20.66	1,033	20.80	901	18.15	910	18.33
Strafford.....	627	17.07	619	16.73	609	16.33	673	17.91	688	18.17	691	18.11	801	20.83	809	21.04	864	22.47	742	19.30	617	16.05	624	16.23
Belknap.....	285	15.09	289	15.12	362	18.71	369	18.84	392	19.78	389	19.40	374	18.40	392	19.29	440	21.65	369	18.16	381	18.74	338	16.63
Carroll.....	333	18.31	269	14.80	303	16.68	294	16.20	328	18.08	298	16.44	303	16.71	341	18.81	342	18.87	305	16.83	299	16.49	297	16.39
Merrimack...	736	15.48	796	16.63	833	17.29	835	17.22	920	18.86	891	18.15	983	19.88	951	19.23	1,064	21.52	1,063	21.50	953	19.27	980	18.81
Hillsborough.	1,655	20.02	1,701	20.15	1,681	19.51	1,697	19.38	1,816	20.59	1,740	19.04	1,973	21.14	1,957	20.98	2,092	22.43	2,103	22.55	1,902	20.39	1,980	21.23
Cheshire.....	497	17.06	494	16.90	475	16.19	482	16.39	488	16.52	525	17.72	557	18.49	482	16.29	608	20.55	595	20.11	514	17.37	512	17.31
Sullivan.....	273	15.32	284	16.02	328	18.59	283	16.12	327	18.72	314	18.06	332	19.81	280	16.18	382	21.49	362	20.92	326	18.84	316	18.26
Grafton.....	652	17.06	611	16.05	616	16.24	602	15.93	655	17.35	625	16.67	651	17.49	648	17.41	749	20.01	696	18.70	638	17.14	681	18.28
Cooks.....	263	12.88	227	10.87	256	12.00	368	16.89	314	14.11	348	15.32	329	14.17	459	19.77	421	18.13	395	17.02	367	15.81	341	14.69
Total.....	6,194	17.26	6,201	17.13	6,426	17.61	6,479	17.61	6,854	18.48	6,696	17.91	7,368	19.56	7,310	19.41	7,988	21.21	7,663	20.35	6,898	18.32	6,929	18.40

Table No. 38.—*Continued.*

Counties.	1896.		1897.		1898.		1899.		1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.	
	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.	Deaths.	Death rates.
Rockingham..	876	17.64	912	18.37	844	16.99	875	17.62	967	18.91	898	17.56	879	17.19	857	16.77	816	15.96	933	18.25	878	17.47	932	18.23
Strafford.....	675	17.56	719	18.70	707	18.39	729	18.96	780	19.57	643	16.34	597	15.18	636	16.17	660	16.77	711	18.07	671	17.05	666	16.93
Belknap .....	346	17.02	332	16.34	347	17.08	356	17.51	374	19.15	348	17.82	338	17.31	377	19.31	322	16.49	357	18.28	407	20.84	358	18.33
Carroll.....	284	15.67	282	15.56	277	15.28	299	16.00	303	17.93	210	12.43	261	15.45	278	16.45	244	14.44	278	16.45	269	15.92	274	16.21
Merrimaek....	887	17.94	872	17.63	827	16.73	914	18.49	1,072	20.44	852	16.25	856	16.33	949	18.10	944	18.00	941	17.94	997	19.01	1,005	19.16
Hillsborough..	2,024	21.71	2,046	21.93	1,899	20.36	1,990	21.34	2,146	19.05	2,115	18.77	2,039	20.39	1,977	17.55	1,923	17.07	2,283	20.26	2,303	20.44	2,226	19.76
Cbeshire.....	438	14.81	479	16.19	499	16.87	523	17.68	496	17.83	534	17.05	435	13.89	458	14.62	525	17.08	508	16.21	495	15.80	524	16.72
Sullivan.....	285	16.47	315	18.20	306	17.68	272	15.66	332	17.88	320	17.77	276	14.99	312	17.32	275	15.19	291	16.15	289	15.95	315	17.48
Grafton.....	634	17.03	639	18.51	638	17.14	662	17.78	719	17.60	677	16.57	611	14.96	678	16.59	634	17.03	622	15.22	744	18.21	706	17.28
Coös.....	342	14.69	381	16.42	399	17.19	434	18.69	435	14.76	378	12.82	363	12.32	447	15.08	451	15.30	415	14.08	445	15.10	480	16.28
Total.....	6,791	18.04	7,027	18.66	6,743	17.91	7,045	18.71	7,624	18.52	6,975	16.94	6,649	16.15	6,969	16.93	6,804	16.53	7,339	17.83	7,498	18.21	7,486	18.18

Table No. 39.

Mortality of Males and Females compared, 1884 to 1907, inclusive.

Years.	Male decedents.	Female decedents.	Male decedents to 100 female decedents.	Death rate of males to 1,000 male population.	Death rate of females to 1,000 of female population.
1884.....	3,034	3,122	97.18	17.79	17.69
1885.....	2,948	3,194	92.29	17.28	18.09
1886.....	3,155	3,212	98.20	18.50	18.20
1887.....	3,174	3,267	97.15	18.61	18.51
1888.....	3,419	3,382	101.09	20.04	19.16
1889.....	3,253	3,389	95.98	19.07	19.20
1890.....	3,692	3,624	101.87	21.65	20.53
1891.....	3,557	3,453	103.01	19.60	17.65
1892.....	3,981	3,990	99.77	21.33	21.00
1893.....	3,827	3,812	100.39	20.51	20.42
1894.....	3,392	3,498	96.97	18.18	18.41
1895.....	3,400	3,515	96.72	18.22	18.50
1896.....	3,364	3,415	98.51	18.03	17.98
1897.....	3,461	3,550	97.49	18.55	18.69
1898.....	3,403	3,335	102.04	18.24	17.55
1899.....	3,532	3,509	100.64	18.93	18.47
1900.....	3,771	3,847	98.02	18.36	18.65
1901.....	3,551	3,423	103.73	17.29	16.59
1902.....	*3,369	3,280	102.71	16.40	15.91
1903.....	†3,550	3,419	103.83	17.28	16.58
1904.....	3,400	3,404	99.88	16.55	16.50
1905.....	‡3,734	3,605	103.57	18.18	17.48
1906.....	§3,770	3,728	101.12	18.35	18.07
1907.....	3,872	3,614	107.13	18.85	17.52

\* One, sex not stated, classed with males.

† Three, sex not stated, classed with males.

‡ Two, sex not stated, classed with males.

§ One, sex not stated, classed with males.

|| Six, sex not stated, classed with males.

Table No. 40.

Deaths at Age Periods, by Percentages, from 1883 to 1907, inclusive.\*

Years.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	Over 60.
1883.....	14.33	7.58	2.56	5.55	8.58	6.73	6.22	7.64	37.93
1884.....	16.22	7.36	2.61	5.30	7.93	6.26	6.33	7.75	38.38
1885.....	15.98	7.14	2.11	4.42	7.50	6.71	6.71	7.76	40.09
1886.....	16.89	7.70	2.86	4.82	7.73	6.55	6.12	7.47	38.86
1887.....	17.64	7.26	2.05	4.89	6.96	6.25	6.56	7.72	39.70
1888.....	19.23	7.63	2.04	4.93	7.07	6.00	5.53	7.57	38.72
1889.....	19.44	7.71	2.66	4.64	6.56	6.15	5.93	7.63	38.40
1890.....	16.23	6.67	1.99	4.28	7.04	7.42	6.62	9.17	40.49
1891.....	18.30	7.08	2.55	4.40	6.95	6.01	6.29	8.15	40.25
1892.....	16.17	6.64	2.18	4.39	6.70	6.63	6.60	8.76	41.77
1893.....	17.83	7.13	1.93	4.32	7.20	6.62	6.94	8.10	39.86
1894.....	17.52	7.31	2.47	3.89	7.06	7.03	6.35	8.54	39.78
1895.....	17.10	7.06	2.09	4.21	6.99	5.82	6.66	8.18	41.88
1896.....	18.08	7.90	2.03	4.31	7.10	6.49	6.14	8.49	39.46
1897.....	17.01	7.21	2.58	3.76	7.12	7.02	6.12	8.45	40.73
1898.....	17.93	7.37	1.83	3.32	6.84	6.69	6.24	8.78	41.00
1899.....	17.54	7.61	1.98	3.53	6.44	5.62	6.72	8.49	42.11
1900.....	17.23	7.72	2.29	3.75	6.75	6.03	6.48	8.79	40.91
1901.....	15.55	6.61	1.84	3.04	6.91	6.65	7.44	9.51	42.45
1902.....	16.21	7.16	2.02	3.49	6.19	6.42	7.14	9.39	41.98
1903.....	15.07	6.48	2.07	3.57	6.62	5.97	6.91	9.39	43.91
1904.....	15.47	5.37	1.82	3.23	6.17	7.09	7.12	9.65	44.07
1895.....	16.68	6.70	2.23	3.74	5.77	6.39	7.45	8.87	42.04
1906.....	18.53	6.14	1.96	3.64	5.34	6.87	6.84	8.52	42.14
1907.....	17.74	5.17	1.82	3.25	5.27	6.26	7.09	9.06	44.32

\* Not including those with age not stated, premature and still births.

Table No. 41.

Deaths at Different Periods, Compared with the Number  
Living at the Same Period, 1906.\*

	1906.	Persons living at same ages, census of 1900.	Death rate per 1,000.
Under 1 year.....	1,379	8,048	171.34
Under 5 years.....	1,836	38,231	48.02
20 to 30 years.....	397	73,992	5.36
All others.....	5,265	299,365	17.58
All ages.....	7,498	411,588	18.21

Table No. 42.

Deaths at Different Periods, Compared with the Number  
Living at the Same Period, 1907.

	1907.	Persons living at same ages, census of 1900.	Death rate per 1,000.
Under 1 year.....	1,323	8,048	164.38
Under 5 years.....	1,707	38,231	44.64
20 to 30 years.....	392	73,992	5.29
All others.....	5,387	299,365	17.98
All ages.....	7,486	411,588	18.18

\* Excluding still births and premature births.

Table No. 43.

Deaths by Ages and Sex, from 1884 to 1907, inclusive.\*

Years.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.
1884. Males.....	460	243	72	136	224	163	180	245	322	502	592	30	1	60
Females.....	353	212	90	192	266	220	211	235	336	444	379	70	1	51
Not stated.....	3	1	.....	1	.....	1	1	.....	1	.....	.....	.....	.....	4
Total.....	816	456	162	328	491	388	392	480	659	946	671	100	1	115
1885. Males.....	416	225	62	109	190	181	190	252	394	478	284	32	1	43
Females.....	371	217	68	164	275	235	226	225	355	463	398	74	2	50
Not stated.....	19	1	1	1	.....	.....	.....	4	2	3	.....	.....	.....	5
Total.....	805	443	131	274	465	416	416	481	751	944	682	106	3	98
1886. Males.....	487	273	94	132	205	188	198	228	368	499	317	42	2	33
Females.....	385	221	90	178	292	233	195	252	339	447	397	83	3	28
Not stated.....	19	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Total.....	891	495	184	310	497	421	393	488	707	946	714	125	5	64
1887. Males.....	490	231	71	142	196	184	186	254	377	512	336	45	1	34
Females.....	416	239	61	175	255	221	239	246	358	494	350	93	6	28
Not stated.....	8	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Total.....	914	470	133	317	451	405	425	500	735	1006	686	138	7	63
1888. Males.....	588	280	75	144	213	177	180	257	392	507	377	47	1	53
Females.....	459	243	65	194	271	241	199	262	375	511	360	79	5	21
Not stated.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Total.....	1060	523	140	338	484	418	379	519	767	1018	737	126	6	87
1889. Males.....	536	269	90	131	187	186	175	241	381	492	342	43	..	29
Females.....	470	245	88	179	251	226	222	270	398	471	366	75	3	29
Not stated.....	8	2	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Total.....	1014	516	178	311	439	412	397	511	779	963	708	118	3	59
1890. Males.....	609	250	73	143	229	242	220	308	422	576	368	52	..	59
Females.....	524	216	66	156	263	277	242	332	399	513	406	86	5	44
Not stated.....	13	2	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	10
Total.....	1146	468	139	299	492	519	462	640	821	1090	774	138	5	113
1891. Males.....	703	256	86	134	248	206	210	279	438	536	346	52	..	69
Females.....	551	231	90	170	232	208	225	284	395	507	412	97	3	48
Not stated.....	10	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Total.....	1264	489	176	304	480	412	435	563	833	1037	758	149	3	118
1892. Males.....	681	251	79	155	219	226	228	312	502	631	397	40	2	88
Females.....	539	251	86	177	287	275	271	349	473	554	467	89	1	61
Not stated.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Total.....	1225	502	165	332	506	501	499	661	975	1185	864	129	6	149
1893. Males.....	716	251	69	146	238	227	225	292	478	568	342	35	5	72
Females.....	574	265	71	167	283	252	277	294	389	537	431	98	3	43
Not stated.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Total.....	1296	516	140	313	521	479	502	586	867	1105	773	133	8	119
1894. Males.....	647	245	82	114	227	219	205	273	395	555	329	49	..	52
Females.....	545	254	87	152	255	261	229	310	396	533	381	76	1	18
Not stated.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Total.....	1196	499	169	266	482	480	434	583	791	1088	710	125	1	74
1895. Males.....	638	236	74	143	205	182	222	262	457	556	332	45	..	48
Females.....	526	247	69	145	273	216	234	298	384	573	429	84	4	33
Not stated.....	6	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	7
Total.....	1170	483	143	288	478	398	456	560	841	1130	761	129	4	88



Table No. 43.—*Concluded.*

Years.		Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.
1896.	Males.....	658	267	62	122	235	199	189	268	419	558	288	46	..	53
	Females.....	545	263	74	167	241	236	223	301	413	489	344	89	..	30
	Not stated.....	9	..	..	..	..	..	..	..	..	..	..	..	..	3
	Total.....	1212	530	136	289	476	435	412	569	832	1047	632	135	..	86
1897.	Males.....	673	256	83	130	223	187	203	291	405	533	380	43	..	54
	Females.....	498	242	96	130	270	299	221	294	447	536	395	81	..	41
	Not stated.....	7	1	..	..	..	..	..	..	..	..	..	..	..	8
	Total.....	1178	499	179	260	493	486	424	585	852	1069	775	124	..	103
1898.	Males.....	679	266	58	111	201	215	200	277	425	556	316	52	2	45
	Females.....	510	224	64	110	254	230	215	307	433	509	364	66	4	45
	Not stated.....	4	..	..	..	..	..	..	..	1	..	..	..	..	..
	Total.....	1193	490	122	221	455	445	415	584	859	1065	680	118	6	90
1899.	Males.....	663	296	74	110	212	179	235	285	426	598	366	34	2	52
	Females.....	555	283	64	139	236	212	232	299	426	566	414	92	5	36
	Not stated.....	2	..	..	..	..	..	..	..	..	..	..	..	..	2
	Total.....	1220	529	138	249	448	391	467	584	852	1164	780	126	7	90
1900.	Males.....	722	304	91	118	235	210	238	315	495	596	350	49	6	42
	Females.....	578	278	82	165	275	245	251	349	457	588	451	95	2	31
	Not stated.....	4	1	..	..	..	..	..	..	..	..	..	..	..	1
	Total.....	1304	583	173	283	510	455	489	664	952	1184	801	144	8	74
1901.	Males.....	603	232	62	103	242	233	256	336	475	580	355	41	1	32
	Females.....	472	225	65	107	236	227	259	322	441	565	384	93	3	24
	Not stated.....	1	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total.....	1076	457	127	210	478	460	515	658	916	1145	739	134	4	56
1902.	Males.....	593	240	70	104	211	209	225	305	449	558	320	46	4	34
	Females.....	476	232	63	126	197	214	246	314	445	494	378	72	1	22
	Not stated.....	..	..	..	..	..	..	..	..	..	..	..	..	..	1
	Total.....	1069	472	133	230	408	423	471	619	894	1052	698	118	5	57
1903.	Males.....	569	231	66	131	221	206	239	348	476	599	383	45	..	33
	Females.....	472	217	77	116	237	207	239	301	476	562	401	91	3	20
	Not stated.....	1	..	..	..	..	..	..	..	..	..	..	..	..	2
	Total.....	1042	448	143	247	458	413	478	649	952	1161	784	136	3	55
1904.	Males.....	577	183	65	107	176	236	250	334	450	574	360	50	3	35
	Females.....	466	179	58	111	240	242	230	317	444	550	438	101	2	26
	Not stated.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total.....	1043	362	123	218	416	478	480	651	894	1124	798	151	5	61
1905.	Males.....	659	255	84	118	189	217	290	341	506	598	377	50	1	47
	Females.....	555	233	78	154	231	248	252	305	467	588	387	91	5	11
	Not stated.....	2	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total.....	1216	488	162	272	420	465	542	646	973	1176	764	141	6	58
1906.	Males.....	772	237	75	137	174	226	252	327	490	619	364	63	..	33
	Females.....	607	220	71	134	223	285	257	307	522	579	406	92	1	24
	Not stated.....	..	..	..	..	..	..	..	..	..	..	..	..	..	1
	Total.....	1379	457	146	271	397	511	509	634	1012	1198	770	155	1	58
1907.	Males.....	726	217	60	126	200	224	269	350	544	675	398	46	2	29
	Females.....	591	167	75	115	192	241	257	323	467	657	410	91	2	26
	Not stated.....	6	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total.....	1323	384	135	241	392	465	526	673	1011	1332	808	137	4	55

\*Excluding those with age and sex not stated, and premature and still births.

Table No. 44.

Percentage of Deaths, by Ages and Sex, to Total Mortality, from 1884 to 1907, inclusive.

Years.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.
1884. Males.....	16.00	8.45	2.51	4.73	7.79	5.84	6.26	8.52	11.20	17.46	10.16	1.04	.04
Females.....	11.74	7.05	2.99	6.38	8.84	7.31	7.02	7.81	11.17	14.76	12.60	2.33	....
Total.....	13.82	7.73	2.75	5.57	8.33	6.60	6.65	8.16	11.18	16.08	11.41	1.70	.02
1885. Males.....	14.78	8.00	2.20	3.87	6.75	6.43	6.75	8.96	14.00	16.99	10.09	1.14	.04
Females.....	12.07	7.06	2.21	5.34	8.95	7.65	7.35	7.32	11.55	15.07	12.95	2.41	.07
Total.....	13.37	7.51	2.21	4.64	7.95	7.07	7.07	8.10	12.72	15.98	11.58	1.80	.05
1886. Males.....	16.06	9.00	3.10	4.35	6.75	6.20	6.53	7.52	12.13	16.45	10.45	1.39	.07
Females.....	12.36	7.10	2.89	5.71	9.37	7.48	6.26	8.09	10.88	14.35	12.74	2.67	.10
Total.....	14.18	8.04	2.99	5.04	8.08	6.85	6.39	7.81	11.50	15.39	11.62	2.03	.08
1887. Males.....	16.20	7.64	2.35	4.69	6.48	6.08	6.15	8.40	12.46	16.92	11.11	1.49	.03
Females.....	13.19	7.58	1.94	5.55	8.09	7.01	7.58	7.80	11.35	15.67	11.10	2.95	.19
Total.....	14.67	7.61	2.14	5.13	7.30	6.56	6.88	8.09	11.90	16.28	11.10	2.23	.11
1888. Males.....	18.16	8.65	2.31	4.45	6.58	5.47	5.56	7.94	12.10	15.66	11.64	1.45	.03
Females.....	14.06	7.45	1.99	5.94	8.30	7.38	6.10	8.03	11.49	15.66	11.03	2.42	.15
Total.....	16.10	8.04	2.15	5.20	7.44	6.43	5.83	7.98	11.80	15.66	11.34	1.94	.09
1889. Males.....	17.44	8.75	2.93	4.26	6.09	6.05	5.70	7.84	12.40	16.01	11.13	1.40	....
Females.....	14.40	7.51	2.70	5.48	7.69	6.92	6.80	8.27	12.20	14.43	11.21	2.30	.09
Total.....	15.88	8.11	2.81	4.89	6.91	6.50	6.27	8.06	12.29	15.20	11.17	1.86	.05
1890. Males.....	17.44	7.15	2.09	4.09	6.55	6.93	6.30	8.82	12.08	16.49	10.54	1.49	....
Females.....	15.03	8.19	1.89	4.47	7.54	7.94	6.94	9.52	11.45	14.72	11.65	2.46	.14
Total.....	16.23	6.67	1.99	4.28	7.04	7.43	6.62	9.17	11.76	15.60	11.09	1.97	.07
1891. Males.....	20.15	7.34	2.47	3.84	7.11	5.91	6.02	8.00	12.56	15.15	9.92	1.49	....
Females.....	16.18	6.78	2.61	4.99	6.81	6.11	6.61	8.34	11.60	14.88	12.09	2.85	.08
Total.....	18.19	7.06	2.55	4.41	6.96	6.01	6.31	8.16	12.08	15.04	10.99	2.16	.04
1892. Males.....	18.29	6.74	2.12	4.16	5.88	6.07	6.12	8.38	13.48	16.94	10.66	1.07	.05
Females.....	14.11	6.56	2.25	4.63	7.51	7.20	7.09	9.13	12.38	14.50	12.22	2.33	.02
Total.....	16.17	6.64	2.18	4.39	6.70	6.63	6.60	8.76	12.91	15.69	11.44	1.70	.03
1893. Males.....	19.93	6.98	1.92	4.07	6.62	6.31	6.26	8.13	13.30	15.81	9.52	.97	.14
Females.....	15.76	7.27	1.95	4.58	7.68	6.92	7.44	8.07	10.68	14.75	11.83	2.69	.08
Total.....	17.83	7.13	1.93	4.32	7.20	6.62	6.94	8.10	11.98	15.14	10.69	1.84	.11
1894. Males.....	19.37	7.33	2.45	3.41	6.79	6.55	6.13	8.17	11.82	16.61	9.85	1.46	....
Females.....	15.66	7.58	2.50	4.36	7.32	7.50	6.58	8.90	11.38	15.31	10.94	2.18	.02
Total.....	17.47	7.31	2.47	3.90	7.06	7.04	6.36	8.54	11.59	15.95	10.41	1.83	.01
1895. Males.....	19.03	7.04	2.21	4.26	6.12	5.43	6.62	7.81	13.63	16.58	9.90	1.34	....
Females.....	15.11	7.09	1.98	4.16	7.84	6.20	6.72	8.56	11.03	16.45	12.32	2.41	.11
Total.....	17.03	7.07	2.09	4.21	6.99	5.82	6.67	8.19	12.31	16.52	11.13	1.88	.06
1896. Males.....	19.87	8.06	1.87	3.66	7.09	6.01	5.71	8.09	12.68	16.85	8.70	1.39	....
Females.....	16.10	7.77	2.19	4.94	7.12	6.96	6.59	8.89	12.20	14.46	10.16	2.62	....
Total.....	18.95	7.92	2.03	4.32	7.11	6.49	6.15	8.49	12.43	15.64	9.43	2.02	....
1897. Males.....	19.75	7.51	2.44	3.82	6.55	5.49	5.96	8.54	11.89	15.64	11.15	1.26	....
Females.....	14.19	6.89	2.74	3.70	7.69	8.52	6.30	8.38	12.74	15.27	11.26	2.31	....
Total.....	16.93	7.20	2.59	3.76	7.03	7.03	6.13	8.46	12.32	15.45	11.21	1.79	....

Table No. 44.—*Concluded.*

Years.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.
1898. Males.....	20.22	7.92	1.73	3.31	5.98	6.40	5.98	8.25	12.65	16.56	9.40	1.55	.05
Females.....	15.50	6.81	1.95	3.34	7.72	6.99	6.53	9.33	13.16	15.47	11.07	2.01	.12
Total.....	17.89	7.37	1.83	3.32	6.84	6.69	6.24	8.79	12.91	16.02	10.23	1.78	.09
1899. Males.....	19.05	8.51	2.13	3.16	6.09	5.14	6.76	8.19	12.21	17.18	10.52	.97	.06
Females.....	15.98	6.71	1.84	4.00	6.79	6.11	6.68	8.61	12.27	16.30	11.92	2.65	.14
Total.....	17.52	7.61	1.98	3.58	6.44	5.62	6.72	8.40	12.25	16.74	11.22	1.81	.10
1900. Males.....	19.37	8.15	2.44	3.17	6.30	5.63	6.38	8.45	13.28	15.98	9.39	1.30	.16
Females.....	15.15	7.29	2.15	4.32	7.21	6.42	6.58	9.14	11.98	15.40	11.82	2.49	.05
Total.....	17.23	7.72	2.29	3.75	6.75	6.03	6.48	8.79	12.62	15.70	10.62	1.91	.11
1901. Males.....	17.13	6.59	1.76	2.93	6.88	6.62	7.27	9.55	13.50	16.48	10.09	1.17	.03
Females.....	13.89	6.62	1.91	3.15	6.94	6.68	7.62	9.47	12.98	16.62	11.29	2.74	.09
Total.....	15.54	6.61	1.84	3.04	6.91	6.65	7.44	9.51	13.24	16.55	10.68	1.93	.06
1902. Males.....	17.78	7.19	2.09	3.12	6.33	6.27	6.75	9.15	13.47	16.73	9.53	1.38	.11
Females.....	14.61	7.12	1.93	3.86	6.04	6.57	7.55	9.64	13.63	15.16	11.60	2.22	.03
Total.....	16.21	7.16	2.02	3.49	6.19	6.42	7.14	9.39	13.55	15.96	10.59	1.81	.07
1903. Males.....	16.19	6.57	1.87	3.72	6.29	5.86	6.80	9.90	13.54	17.05	10.89	1.28	....
Females.....	14.13	6.49	2.31	3.17	7.09	6.20	7.15	9.01	14.25	16.83	11.79	2.67	.08
Total.....	15.07	6.48	2.07	3.57	6.62	5.97	6.91	9.39	13.77	16.79	11.34	1.97	.04
1904. Males.....	17.14	5.43	1.93	3.18	5.23	7.01	7.43	9.92	16.34	17.06	10.69	1.48	.08
Females.....	13.79	5.29	1.71	3.29	7.10	7.16	6.81	9.38	13.14	16.28	12.97	2.99	.05
Total.....	15.47	5.37	1.82	3.23	6.17	7.09	7.12	9.65	13.26	16.67	11.83	2.24	.07
1905. Males.....	17.88	6.92	2.28	3.20	5.13	5.88	7.88	9.25	13.73	16.23	10.23	1.38	....
Females.....	15.44	6.48	2.17	4.28	6.43	6.30	7.01	8.49	12.97	16.21	10.77	2.63	.13
Total.....	16.68	6.70	2.23	3.74	5.77	6.39	7.45	8.87	13.37	16.16	10.49	1.95	.07
1906. Males.....	20.67	6.34	2.00	3.67	4.66	6.05	6.74	8.75	13.12	16.57	9.74	1.68	....
Females.....	16.39	5.94	1.92	3.62	6.02	7.69	6.94	8.29	14.09	15.63	10.96	2.48	.02
Total.....	18.53	6.14	1.96	3.64	5.34	6.87	6.84	8.52	13.60	16.10	10.35	2.08	.01
1907. Males.....	18.92	5.66	1.56	3.28	5.21	5.84	7.00	9.12	14.17	17.59	10.37	1.22	.05
Females.....	16.47	4.65	2.09	3.20	5.35	6.72	7.16	9.00	13.02	18.33	11.43	2.53	.05
Total.....	17.74	5.17	1.82	3.25	5.27	6.26	7.09	9.06	13.61	17.94	10.88	1.84	.05

\* Excluding those with age and sex not stated, and premature and still births.

Table No. 45.

Total Deaths by Seasons, 1906.\*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Months.....	646	584	742	640	645	524	553	696	639	622	561	642	
Quarters.....	1,972				1,809				1,888				1,827
Percentages.....	26.31				24.13				25.19				24.37
Half years.....			3,781						3,715				
Percentages.....			50.44						49.56				
Total deaths.....							7,496						

\* Not including deaths with month not stated, and still births.

Table No. 46.

Total Deaths by Seasons, 1907.\*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Months.....	802	692	724	638	636	552	532	612	617	569	561	551
Quarters .....	2,218				1,826				1,761		1,681	
Percentages.....	29.63				24.39				23.52		22.46	
Half years.....			4,044						3,442			
Percentages.....			54.62						45.98			
Total deaths.....					7,486							

\* Not including deaths with month not stated, and still births.

## No. 47.

## Nativity of Persons Deceased from 1884 to 1907, inclusive.

Years.	Total deaths.*	Native born.		Foreign born.	
		Deaths.	Percentage.	Deaths.	Percentage.
1884.....	6,194	4,868	89.01	601	10.99
1885.....	6,201	4,847	89.35	578	10.65
1886.....	6,426	4,989	88.52	647	11.48
1887.....	6,479	5,131	88.03	698	11.97
1888.....	6,854	5,449	87.53	776	12.47
1889.....	6,696	5,383	88.00	734	12.00
1890.....	7,368	5,672	86.45	889	13.55
1891.....	7,310	5,637	86.52	878	13.47
1892.....	7,988	6,155	86.82	934	13.17
1893.....	7,663	5,847	85.03	1,029	14.97
1894.....	6,898	5,310	85.01	936	14.99
1895.....	6,929	5,428	85.05	954	14.95
1896.....	6,791	5,196	83.73	1,010	16.27
1897.....	7,027	5,387	83.95	1,030	16.05
1898.....	6,743	5,296	84.83	947	15.17
1899.....	7,045	5,482	84.01	1,043	15.99
1900.....	7,624	5,975	83.54	1,177	16.46
1901.....	6,975	5,417	82.64	1,188	17.36
1902.....	6,649	5,197	82.86	1,075	17.14
1903.....	6,969	5,361	81.66	1,204	18.34
1904.....	6,804	5,362	83.13	1,088	16.87
1905.....	7,339	5,734	82.07	1,253	17.93
1906.....	7,498	5,871	82.10	1,280	17.90
1907.....	7,486	5,368	75.29	1,761	24.71

\* Including those whose nativity was not recorded. In the calculations of percentages the rates are not given to the *total* reported deaths, but only to the total of those cases where the nativity was stated.



Table No. 48.  
Deaths from Various Causes for Twenty-four Years—1884-1907.

Years.	Typhoid fever.	Smallpox.	Measles.	Scarlet fever.	Whooping cough.	Diphtheria.	Membranous croup.	Influenza.	Dysentery.	Erysipelas.	Tuberculosis of lungs.	Cancer.	Meningitis*.	Apoplexy.	Paralysis.	Heart disease.	Bronchitis (acute and chronic).	Pneumonia.	Diarrhoea and enteritis (cholera infantum).	Bright's disease.	Senile debility (old age).
1884.....	137	...	3	52	14	110	49	3	80	19	868	210	120	204	248	507	78	436	266	117	601
1885.....	136	2	45	53	25	78	74	6	40	25	857	213	133	206	278	489	112	504	219	130	587
1886.....	134	...	18	21	26	156	64	5	79	18	809	206	141	220	249	510	81	466	362	108	566
1887.....	134	...	39	26	21	177	84	9	53	20	766	218	117	210	253	552	114	556	336	122	527
1888.....	150	...	55	34	23	103	94	6	63	36	742	203	143	243	273	575	142	628	370	113	519
1889.....	161	...	16	18	47	210	88	4	67	27	651	213	151	259	196	564	127	582	353	156	530
1890.....	143	...	19	16	26	164	61	33	48	29	825	276	186	263	251	568	194	703	399	157	614
1891.....	170	...	19	13	27	160	56	143	51	43	695	222	161	283	241	572	180	673	486	174	593
1892.....	109	...	24	27	37	134	45	331	42	39	736	225	173	308	209	571	217	890	366	183	516
1893.....	121	...	32	52	23	63	36	91	63	29	737	283	208	331	239	605	191	685	423	158	436
1894.....	135	...	14	61	51	73	44	121	39	18	714	230	223	294	232	649	195	633	400	145	439
1895.....	99	4	7	58	26	78	49	121	39	18	693	266	227	321	252	691	187	639	411	188	453
1896.....	139	...	23	23	33	85	59	47	40	19	679	275	232	357	210	647	161	557	332	191	465
1897.....	92	...	12	34	16	82	61	130	28	22	697	265	233	345	229	647	241	650	320	232	485
1898.....	108	...	10	25	21	71	37	51	54	20	607	305	222	343	230	619	141	524	459	229	506
1899.....	92	...	15	20	74	55	47	170	26	20	582	279	219	376	251	685	185	753	364	242	478
1900.....	100	...	19	27	40	61	36	183	38	17	650	292	254	362	247	682	200	942	462	248	483
1901.....	89	5	4	50	20	60	30	139	37	20	629	364	207	340	221	692	162	716	368	242	480
1902.....	72	6	19	4	31	136	26	51	27	18	569	341	206	412	177	701	169	618	291	297	363
1903.....	86	...	13	9	31	77	25	80	20	10	530	314	201	431	197	747	127	686	328	348	424
1904.....	76	2	3	9	13	43	25	71	29	33	575	326	172	430	203	673	150	630	332	339	430
1905.....	56	...	24	2	30	60	17	98	33	14	571	344	352	453	174	690	142	690	321	380	430
1906.....	76	...	6	10	53	58	28	46	30	10	538	355	265	446	169	681	166	525	398	430	423
1907.....	49	...	8	7	21	76	19	110	12	12	465	386	217	523	205	750	209	602	297	387	569
Total ....	2,724	20	437	640	729	2,373	1,157	2,049	1,040	534	16,185	6,621	4,763	7,960	5,450	15,067	3,871	15,293	8,783	5,365	11,747

\* Including cephalitis, cerebritis and encephalitis.



Table No. 49.

## CONSUMPTION (PULMONARY TUBERCULOSIS).

Deaths from Consumption (Pulmonary Tuberculosis) in  
New Hampshire for Twenty-four Years, by  
Age Periods.

Years.	Total.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Not stated.
1884.....	868	50	113	218	145	93	78	64	67	21	19
1885.....	857	49	98	219	161	109	75	75	43	19	9
1886.....	809	44	87	233	152	94	67	71	37	18	6
1887.....	766	34	88	193	145	101	78	55	46	21	5
1888.....	742	48	88	219	137	71	62	55	42	15	5
1889.....	651	36	81	147	120	77	56	65	53	10	6
1890.....	825	49	77	200	156	113	65	72	63	23	7
1891.....	695	47	87	174	131	89	67	37	43	10	10
1892.....	736	28	88	178	150	84	67	71	41	20	9
1893.....	737	45	71	204	139	92	65	64	34	14	9
1894.....	714	50	70	200	150	82	59	45	45	8	5
1895.....	693	31	66	210	129	85	60	49	51	10	2
1896.....	679	41	81	180	130	85	59	49	37	9	8
1897.....	697	36	79	225	143	70	46	49	32	12	5
1898.....	607	26	53	181	143	66	52	47	22	7	10
1899.....	582	26	57	169	103	80	65	38	28	10	6
1900.....	650	36	70	193	120	76	45	61	44	1	4
1901.....	629	42	57	178	130	71	53	48	40	7	3
1902.....	569	23	62	138	134	83	51	43	24	5	6
1903.....	530	26	47	141	107	66	54	49	31	7	2
1904.....	575	30	43	181	126	74	54	43	18	3	3
1905.....	571	28	54	143	131	95	49	45	20	3	3
1906.....	538	34	51	138	136	76	36	31	22	8	3
1907.....	465	19	39	125	111	67	46	29	21	6	2
Total.....	16,185	878	1,710	4,387	3,229	1,999	1,409	1,255	904	267	147

Table No. 50.

Mortality from Consumption 1884 to 1907, inclusive.\*

Years.	Deaths.	Percentages of deaths to deaths from all causes.	Death rate per 10,000 living population (estimated).
1884.....	865	14.01	24.10
1885.....	857	13.82	23.68
1886.....	809	12.58	22.17
1887.....	766	11.82	20.82
1888.....	742	10.82	20.01
1889.....	651	9.72	17.42
1890.....	825	11.19	21.91
1891.....	695	9.51	18.31
1892.....	736	9.21	19.24
1893.....	737	9.62	19.13
1894.....	714	10.35	18.38
1895.....	693	10.00	17.71
1896.....	679	9.99	17.22
1897.....	697	9.92	17.55
1898.....	607	9.00	15.16
1899.....	582	8.26	14.43
1900.....	650	8.20	15.79
1901.....	629	9.02	15.14
1902.....	569	8.55	13.58
1903.....	530	7.57	12.54
1904.....	575	8.45	13.49
1905.....	571	7.78	13.28
1906.....	538	7.17	12.41
1907.....	465	6.21	10.63

\* Still births and premature births have not been included in these calculations since 1893.

Table No. 51.

Deaths from Consumption by Nativity, Civil Condition and Sex, by Counties, for 1906.

Counties.	Sex.	American.	Foreign.	Not stated.	Married.	Single.	Widowed.	Not stated.	Total.	Grand total.
Rockingham.....	Males.....	15	9	2	10	14	1	1	26	72
	Females...	33	10	8	27	13	4	2	46	
Strafford.....	Males.....	12	4	2	10	8	.....	...	18	56
	Females...	28	6	4	21	11	4	2	38	
Belknap.....	Males.....	14	1	...	4	6	2	3	15	30
	Females...	9	6	...	7	3	*2	3	15	
Carroll.....	Males.....	4	2	...	3	2	1	...	6	15
	Females...	8	1	...	4	5	.....	...	9	
Merrimack.....	Males.....	26	8	1	12	15	3	5	35	60
	Females...	16	9	...	13	10	2	...	25	
Hillsborough....	Males.....	60	30	1	40	32	11	8	91	183
	Females...	49	41	2	41	29	*11	11	92	
Cheshire.....	Males.....	13	3	...	4	9	2	1	16	35
	Females...	10	8	1	10	7	2	...	19	
Sullivan.....	Males.....	10	3	...	5	6	1	1	13	27
	Females...	11	2	1	7	5	1	1	14	
Grafton.....	Males.....	14	2	1	9	5	2	1	17	37
	Females...	18	2	...	9	9	2	...	*20	
Coös.....	Males.....	3	5	1	5	2	.....	2	9	23
	Females...	9	5	...	7	6	.....	1	14	
Total for state..	Males.....	171	67	8	102	99	23	22	246	538
	Females...	191	90	11	146	98	28	20	292	
Grand total.....		362	157	19	248	197	51	42	538	538

\* One divorced.

Table No. 52.

Deaths from Consumption by Nativity, Civil Condition and Sex, by Counties, for 1907.

Counties.	Sex.	American.	Foreign.	Not stated.	Married.	Single.	Widowed.	Not stated.	Total.	Grand total.
Rockingham.....	Males.....	36	10	3	23	18	4	4	49	79
	Females...	19	8	3	17	9	2	2	30	
Strafford.....	Males.....	16	4	2	10	10	1	1	22	45
	Females...	11	12	....	15	4	2	2	23	
Belknap .....	Males.....	5	3	....	3	2	*3	....	8	23
	Females...	10	3	2	7	1	3	4	15	
Carroll.....	Males.....	6	....	....	5	....	1	....	6	12
	Females...	4	1	1	3	2	1	....	6	
Merrimack.....	Males.....	23	6	3	19	10	†2	1	32	66
	Females...	21	10	3	18	12	3	1	34	
Hillsborough.....	Males.....	41	28	1	27	36	†5	2	70	136
	Females...	39	27	....	28	27	†7	4	66	
Cheshire.....	Males.....	5	6	....	6	3	2	....	11	28
	Females...	14	2	1	5	12	....	....	17	
Sullivan.....	Males.....	7	....	1	3	3	1	1	8	18
	Females...	7	3	....	5	2	3	....	10	
Grafton.....	Males.....	17	1	1	8	5	4	2	19	39
	Females...	16	1	3	9	6	†3	2	20	
Coös.....	Males.....	5	3	1	2	6	1	....	9	19
	Females...	7	3	....	8	2	....	....	10	
Total for state..		161	61	12	106	93	24	11	234	465
	Males.....	148	70	13	115	77	24	15	231	
Grand total.....		309	131	25	221	170	48	26	465	465

\* Two divorced.

† One divorced.

Table No. 53.  
Mortality from Consumption by Counties, with Percentages of Deaths to Total Mortality, from 1884 to 1907, inclusive.

Counties.	1884.		1885.		1886.		1887.		1888.		1889.		1890.		1891.		1892.		1893.		1894.		1895.	
	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.
Rockingham.....	130	14.89	134	14.70	142	14.74	130	14.84	96	10.71	88	10.05	134	12.58	85	8.57	133	12.96	113	10.94	101	11.21	99	10.88
Strafford.....	105	16.74	96	15.50	96	15.76	80	11.88	93	13.51	75	10.85	117	14.80	94	11.62	84	9.72	78	10.51	78	12.64	65	10.42
Belknap.....	54	18.94	50	17.30	37	10.22	48	13.00	46	11.73	42	10.79	40	10.69	44	11.23	35	7.95	47	12.74	43	11.28	32	9.46
Carroll.....	46	13.81	33	12.26	41	13.53	33	11.22	26	7.92	29	9.73	25	8.25	32	9.38	36	10.53	36	11.80	26	8.69	26	8.75
Merrimack.....	91	12.36	102	12.81	79	9.48	96	11.49	101	10.97	88	9.87	114	11.59	89	9.36	100	9.40	108	10.16	112	11.75	91	9.78
Hillsborough.....	229	13.83	233	13.69	218	12.96	179	10.55	209	11.32	168	9.64	204	10.33	197	10.06	175	8.36	190	9.03	194	10.19	182	9.19
Cheshire.....	62	12.47	75	15.18	60	12.63	50	10.87	47	9.63	53	10.09	51	9.15	49	10.16	56	9.21	48	8.06	48	9.34	50	9.76
Sullivan.....	36	13.18	36	12.67	45	13.72	32	11.30	36	11.00	28	8.91	32	9.63	20	7.15	27	7.07	32	8.84	32	9.81	40	12.66
Grafton.....	83	12.73	70	11.45	72	11.72	80	13.28	63	9.61	58	9.27	70	10.75	57	8.79	58	7.77	53	7.61	52	8.15	71	10.43
Coös.....	32	12.16	28	12.33	19	7.42	38	10.32	25	7.96	22	6.32	38	11.51	28	6.10	32	7.60	32	8.10	28	7.63	37	10.85
Total.....	868	14.01	857	13.82	809	12.58	766	11.82	742	10.82	651	9.72	825	11.19	695	9.51	736	9.21	737	9.62	714	10.35	698	10.00

Table 53.—Continued.

Counties.	1896.		1897.		1898.		1899.		1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.	
	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.	Deaths.	Percentages.
Rockingham.....	92	10.50	96	10.53	84	9.95	78	8.91	83	8.91	73	8.13	78	8.87	66	7.70	83	10.17	71	7.60	72	8.20	79	8.47
Strafford.....	65	9.63	93	12.93	73	10.32	67	9.18	75	9.61	76	11.83	73	12.22	64	10.06	69	10.45	48	6.75	56	8.34	45	6.75
Belknap.....	31	8.96	37	11.14	28	8.07	27	7.58	39	10.43	28	8.05	28	8.28	33	8.75	22	6.83	18	5.04	30	7.37	23	6.42
Carroll.....	21	7.39	29	10.28	30	10.83	19	6.55	24	7.92	23	10.95	23	8.81	17	6.11	22	9.01	25	8.99	15	5.57	12	4.37
Merrimack.....	79	8.91	71	8.14	75	9.06	67	7.33	65	6.06	67	7.86	78	9.11	64	6.74	65	6.88	82	8.71	60	6.01	66	6.56
Hillsborough.....	234	11.61	193	9.43	176	9.26	191	9.59	206	9.59	210	9.93	157	7.69	159	8.04	182	9.46	199	8.71	183	7.94	136	6.10
Cheshire.....	89	8.90	50	10.44	38	7.61	36	6.88	46	9.28	46	8.61	26	5.97	30	6.55	40	7.61	39	7.67	35	7.07	28	5.34
Sullivan.....	39	13.65	31	9.84	30	9.80	18	6.62	24	7.23	27	8.44	22	8.15	21	6.73	17	6.18	20	6.87	27	9.34	18	5.71
Grafton.....	51	8.04	63	9.14	46	7.21	53	8.01	63	8.76	42	6.20	56	9.16	45	6.64	40	6.30	42	6.75	37	4.97	39	5.52
Cooks.....	28	8.19	34	8.92	27	6.77	26	5.99	25	5.75	37	9.78	28	7.71	31	6.93	35	7.76	27	6.50	23	5.16	19	3.95
Total .....	679	9.99	697	9.92	607	9.00	582	8.26	650	8.20	629	9.02	569	8.55	530	7.57	575	8.45	571	7.78	538	7.17	465	6.21



Table No. 54.  
 Percentage of Deaths from Consumption to the Total Mortality of the Cities of the State, for the years  
 1883 to 1907, inclusive.

	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Manchester...	14.89	14.28	13.03	15.01	11.15	12.37	9.30	10.29	10.40	8.77	8.49	9.44	8.24	12.08	10.16	9.01	9.84	10.47	9.48	7.88	7.41	8.90	8.33	7.49	5.91
Concord .....	11.41	8.66	10.68	8.60	10.13	10.23	9.81	9.13	9.30	8.43	9.15	11.69	9.01	9.09	6.73	6.78	6.65	5.45	8.89	7.97	6.07	7.42	9.43	6.54	6.50
Nashua.. ..	16.96	13.72	14.86	10.49	9.73	8.20	8.64	10.69	10.29	6.47	7.69	8.57	7.96	8.48	12.25	10.61	8.39	9.05	9.95	10.51	9.66	10.75	12.07	6.88	7.33
Dover.....	20.97	16.60	16.17	21.17	14.57	12.01	10.31	16.40	12.01	11.18	13.03	14.28	11.06	10.25	9.97	10.49	12.33	10.48	10.69	8.00	8.41	11.61	7.95	8.40	6.81
Portsmouth...	16.02	14.74	12.18	17.84	16.26	13.26	7.73	14.34	8.17	17.61	10.08	13.66	21.11	13.66	14.59	9.33	9.39	9.75	8.41	5.50	8.78	17.08	9.89	8.19	9.69
Keene .....	16.91	16.00	22.80	16.00	11.90	9.47	9.62	10.25	11.90	13.77	9.43	10.34	11.11	9.01	9.02	11.36	6.76	11.46	10.65	4.16	6.06	9.33	8.92	5.42	5.00
Rochester.. ..	.....	.....	.....	.....	.....	.....	.....	.....	11.80	9.70	5.31	10.08	11.36	8.47	15.09	13.01	13.75	10.63	18.80	21.60	11.97	12.66	10.96	4.13	5.12
Laconia.....	.....	.....	.....	.....	.....	.....	.....	.....	7.75	11.49	15.00	9.28	12.24	13.53	12.69	9.03	13.04	11.24	8.82	10.86	9.85	5.22	9.74	7.92	
Somersworth..	.....	.....	.....	.....	.....	.....	.....	.....	11.68	11.20	8.54	8.33	10.91	17.01	9.09	4.91	10.15	7.50	14.87	8.77	10.78	5.40	5.26	7.69	
Franklin.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.11	7.02	13.89	9.52	8.33	8.82	5.00	7.14	10.22	7.52	6.89	10.58	9.30	6.17
Berlin.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.05	5.26	1.84	5.26	4.85	10.56	6.14	4.73	4.37	3.55	5.37	1.91

## PNEUMONIA.

Table No. 55.

Mortality from Pneumonia in New Hampshire from 1883  
to 1907, inclusive, by Ages.

Years.	Under 1.	1 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Unknown.	Total.
1883.....	82	....	5	8	12	30	21	36	45	86	94	66	13	498
1884.....	51	48	3	3	6	27	23	30	36	50	97	54	8	436
1885.....	69	49	8	4	11	15	27	32	37	72	105	74	1	504
1886.....	57	38	13	6	13	17	24	29	49	68	92	53	7	466
1887.....	68	33	7	5	13	28	32	40	48	89	121	68	4	556
1888.....	67	45	6	10	19	40	49	51	62	67	123	81	8	628
1889.....	61	50	8	12	17	29	36	40	48	98	100	79	4	582
1890.....	73	48	9	10	11	35	46	45	79	106	127	107	7	703
1891.....	73	43	15	6	11	43	31	38	74	109	126	95	9	673
1892.....	77	49	13	6	12	41	61	60	95	147	190	128	11	890
1893.....	86	65	15	5	15	36	39	55	60	95	120	88	6	685
1894.....	88	62	13	4	11	29	38	48	63	87	103	83	4	633
1895.....	69	62	11	8	16	27	32	46	57	101	127	74	9	639
1896.....	103	96	8	5	10	22	29	35	34	68	82	63	2	557
1897.....	122	82	18	7	9	22	36	33	56	78	100	87	5	650
1898.....	84	68	12	7	9	25	35	34	31	59	101	55	4	524
1899.....	130	97	19	9	19	25	39	46	50	85	129	99	6	753
1900.....	142	125	14	11	18	48	64	76	95	112	141	88	8	942
1901.....	105	82	13	3	9	41	35	65	55	78	136	89	5	716
1902.....	118	86	14	7	10	35	31	32	51	76	82	73	3	618
1903.....	127	87	19	11	17	26	42	40	54	85	95	78	5	686
1904.....	94	68	12	6	12	27	46	40	60	65	116	84	5	635
1905.....	110	86	13	6	16	26	36	51	54	76	110	100	6	690
1906.....	63	46	9	7	10	18	25	37	61	80	97	63	9	525
1907.....	72	47	11	9	14	26	36	47	47	89	128	74	2	602
Total.....	2191	1562	283	175	320	738	913	1086	1401	2126	2842	2003	151	15,791

Table No. 56.

Mortality from Pneumonia by Months from 1884 to 1907,  
inclusive.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Not stated.
1884.....	55	55	51	52	32	13	14	11	5	28	51	67	2
1885.....	53	59	101	95	35	25	13	10	10	33	38	32	....
1886.....	32	44	73	51	51	33	22	18	18	24	46	54	....
1887.....	71	73	85	85	49	17	13	13	14	34	47	54	1
1888.....	72	95	75	73	76	24	16	23	21	43	36	72	2
1889.....	69	66	79	102	51	22	15	19	16	53	41	49	....
1890.....	213	74	69	43	47	35	18	9	23	23	69	79	1
1891.....	73	60	82	72	95	41	13	7	14	23	37	152	4
1892.....	384	110	83	86	57	21	5	11	19	21	34	54	5
1893.....	75	71	95	87	67	38	18	14	14	24	48	133	1
1894.....	141	91	66	75	57	30	16	17	18	27	47	47	1
1895.....	89	91	141	78	34	29	14	15	16	29	35	66	2
1896.....	62	63	167	58	61	27	25	12	22	53	38	69	....
1897.....	84	87	261	67	48	30	15	8	22	33	41	54	....
1898.....	58	57	48	67	80	26	11	11	19	24	44	78	1
1899.....	168	114	82	91	44	25	28	17	24	35	28	97	....
1900.....	124	91	145	226	104	45	19	20	21	35	49	63	...
1901.....	79	134	126	81	67	35	10	14	13	37	49	71	....
1902.....	72	75	68	73	69	32	16	18	29	33	52	81	....
1903.....	93	111	89	66	64	23	29	17	18	35	62	79	....
1904.....	75	101	117	74	45	14	16	12	28	38	47	68	....
1905.....	97	125	116	82	52	25	27	12	22	30	51	51	....
1906.....	73	72	87	58	37	21	13	7	17	34	39	67	....
1907.....	124	84	72	67	53	33	14	10	21	31	39	54	....
Total.....	2436	2003	2178	1909	1375	664	400	325	444	780	1068	1691	20

Table No. 57.  
Mortality from Pneumonia by Counties from 1884 to 1907, inclusive.

Counties.	Years.																							Grand total.	
	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906		1907
Rockingham .....	45	63	77	70	83	66	90	77	96	88	83	83	65	83	62	83	110	110	74	66	71	86	76	75	.....
Strafford .....	39	48	37	46	52	38	80	73	96	65	66	58	64	68	56	75	129	61	39	60	51	70	39	47	.....
Belknap .....	18	24	25	44	50	37	42	28	55	31	46	29	28	27	33	30	48	28	26	39	27	35	24	25	.....
Carroll .....	30	27	15	33	46	49	37	42	50	19	32	28	22	28	23	41	36	17	20	29	23	34	29	30	.....
Merrimack .....	50	72	60	85	73	86	94	73	137	95	85	83	73	70	53	86	157	80	83	93	89	73	68	85	.....
Hillsborough .....	110	128	112	128	129	131	158	185	175	159	154	175	159	189	154	228	236	220	205	201	177	213	153	162	.....
Cheshire .....	36	52	39	55	55	52	44	54	86	64	50	44	25	38	30	61	61	44	28	36	42	57	32	40	.....
Sullivan .....	21	22	23	22	30	31	32	31	62	45	31	32	23	36	25	37	37	36	31	40	41	18	20	27	.....
Grafton .....	66	48	54	52	77	64	74	53	84	71	53	66	61	75	54	59	81	74	67	72	65	49	52	55	.....
Cooks .....	21	20	24	21	33	26	52	57	49	48	33	41	37	86	34	53	47	46	45	50	49	55	32	56	.....
Total .....	436	504	466	556	628	582	703	673	890	685	633	639	557	650	524	753	942	716	618	686	635	690	525	602	15,293

## DIPHTHERIA AND MEMBRANOUS CROUP.

Table No. 58.

Mortality from Croup and Diphtheria, from 1884 to 1907, inclusive.

Years.	Deaths.			Percentages of deaths to deaths from all causes.			Death rates per 10,000 living.*		
	Croup.	Diphtheria.	Total.	Croup.	Diphtheria.	Total.	Croup.	Diphtheria.	Total.
1884.....	49	110	159	.79	1.77	2.56	1.36	3.06	4.42
1885.....	74	78	152	1.19	1.25	2.44	2.04	2.15	4.19
1886.....	64	156	220	.99	2.41	3.40	1.75	4.27	6.02
1887.....	84	177	261	1.29	2.73	4.02	2.28	4.81	7.09
1888.....	94	103	197	1.37	1.50	2.87	2.53	2.77	5.30
1889.....	88	210	298	1.31	3.13	4.44	2.35	5.61	7.96
1890.....	64	164	228	.86	2.21	3.08	1.69	4.32	6.02
1891.....	56	160	216	.79	2.20	2.10	1.48	4.22	5.69
1892.....	45	134	179	.56	1.69	2.25	1.18	3.50	4.68
1893.....	36	63	99	.47	.82	1.29	.93	1.63	2.57
1894.....	44	73	117	.64	1.05	1.69	1.13	1.88	3.01
1895.....	49	78	127	.71	1.12	1.83	1.25	1.99	3.25
1896.....	59	85	144	.87	1.25	2.12	1.49	2.16	3.65
1897.....	61	82	143	.87	1.17	2.04	1.53	2.06	3.59
1898.....	37	71	108	.55	1.05	1.60	.92	1.77	2.69
1899.....	47	55	102	.66	.78	1.44	1.16	1.36	2.52
1900.....	36	64	100	.47	.84	1.31	.87	1.55	2.42
1901.....	30	60	90	.43	.86	1.29	.72	1.44	2.16
1902.....	26	136	162	.39	2.04	2.43	.62	3.24	3.86
1903.....	25	77	102	.36	1.10	1.46	.59	1.82	2.41
1904.....	25	43	68	.36	.63	.99	.58	1.01	1.59
1905.....	17	60	77	.23	.81	1.04	.40	1.39	1.79
1906.....	28	58	86	.37	.77	1.14	.64	1.33	1.97
1907.....	19	76	95	.25	1.01	1.26	.43	1.73	2.16
Total.....	1,157	2,373	3,530	.....	.....	.....	.....	.....	.....
Average.....	48	98	147	.69	1.42	2.09	1.24	2.54	3.79

\* Estimated population.

## TYPHOID FEVER.

Table No. 59.

Deaths from Typhoid Fever, by Age Periods, from 1884 to 1907, inclusive.

Years.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Not stated.	Total.
1884.....	22	32	34	12	8	7	8	8	3	3	137
1885. ....	16	31	34	14	8	7	10	11	3	2	136
1886. ....	23	45	51	16	12	15	14	16	2	.....	194
1887.....	9	38	41	17	8	7	6	5	2	1	134
1888.....	20	37	39	12	8	8	9	8	3	6	150
1889.....	18	40	50	13	14	10	5	6	4	1	161
1890.....	14	35	33	18	14	10	7	7	3	2	143
1891.....	18	39	52	17	15	8	9	8	3	1	170
1892.....	11	27	24	18	8	5	6	3	4	3	109
1893.....	12	32	29	22	10	5	5	3	1	2	121
1894.....	13	24	39	19	11	9	10	8	2	.....	135
1895.....	5	26	28	10	12	4	7	3	1	3	99
1896. ....	18	24	47	21	6	6	10	5	1	1	139
1897.....	12	22	22	12	8	10	4	1	1	.....	92
1898.....	9	25	36	14	11	7	3	2	.....	1	108
1899.....	5	16	34	13	7	4	7	3	1	2	92
1900.....	7	17	38	13	9	4	5	3	1	3	100
1901.....	11	11	19	20	10	9	6	2	1	....	89
1902.....	8	18	17	12	6	3	4	1	1	2	72
1903.....	7	17	26	13	5	4	6	8	.....	.....	86
1904.....	5	13	22	17	7	2	4	5	1	.....	76
1905.....	5	14	12	9	7	5	4	.....	.....	.....	56
1906.....	7	13	18	16	10	5	4	2	.....	1	76
1907.....	2	9	8	14	6	2	5	1	.....	2	49
Total.....	277	605	753	362	220	156	158	119	38	36	2,724



Table No. 60.

Typhoid Fever—Mortality from to Each 10,000 of the  
Population of Same Age Period for Twenty-four  
Years, from 1884 to 1907, inclusive.

1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Not stated.
1.77	3.80	4.57	2.82	2.08	1.85	2.59	3.35	3.14	.....

## SCARLET FEVER

Table No. 61.

Mortality from Scarlatina, from 1884 to 1907, inclusive.

Years.	Deaths.	Percentages of deaths to deaths from all causes.	Death rates per 10,000 living population.*
1884.....	52	.83	1.44
1885.....	53	.85	1.46
1886.....	21	.32	.57
1887.....	26	.40	.70
1888.....	34	.49	.91
1889.....	18	.26	.48
1890.....	16	.21	.42
1891.....	13	.18	.34
1892.....	27	.33	.71
1893.....	52	.67	1.35
1894.....	61	.88	1.57
1895.....	58	.83	1.48
1896.....	23	.34	.58
1897.....	34	.48	.86
1898.....	25	.37	.62
1899.....	20	.28	.49
1900.....	27	.35	.65
1901.....	50	.72	1.20
1902.....	4	.06	.09
1903.....	9	.13	.21
1904.....	9	.13	.21
1905.....	2	.02	.04
1906.....	10	.13	.23
1907.....	7	.09	.16
Total.....	651	.....	.....
Average.....	27	.38	.69

\* Estimated population.

Table 62.  
Deaths from Heart Disease, 1884 to 1907.

Years.	Number of deaths.	Rate per 10,000 to estimated population.
1884.....	507	14.12
1885.....	489	13.51
1886.....	510	13.98
1887.....	552	15.01
1888.....	575	15.51
Average rate for five years, 14.43.		
1889.....	564	15.09
1890.....	568	15.08
1891.....	572	15.05
1892.....	571	14.89
1893.....	605	15.64
Average rate for five years, 15.15.		
1894.....	649	16.63
1895.....	691	17.55
1896.....	647	16.28
1897.....	647	16.14
1898.....	619	15.30
Average rate for five years, 16.37.		
1899.....	685	16.79
1900.....	682	16.56
1901.....	692	16.66
1902.....	701	16.73
1903.....	747	17.67
Average rate for five years, 16.89.		
1904.....	673	15.79
1905.....	690	16.05
1906.....	681	15.70
1907.....	750	17.15
Average rate for four years, 16.17.		

# CANCER.

Table No. 63.

Table Showing Deaths in New Hampshire from Cancer for Twenty-four Years.

Year.	Deaths from cancer.	Year.	Deaths from cancer.	Year.	Deaths from cancer.
1884.....	210	1892.....	235	1900.....	292
1885.....	213	1893.....	283	1901.....	364
1886.....	206	1894.....	230	1902.....	341
1887.....	218	1895.....	266	1903.....	314
1888.....	203	1896.....	275	1904.....	326
1889.....	213	1897.....	265	1905.....	344
1890.....	276	1898.....	305	1906.....	355
1891.....	222	1899.....	279	1907.....	386

## APOPLEXY.

Table No. 64.

Deaths from Apoplexy by Age Periods, from 1884 to 1907, inclusive.

Years.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Not stated.	Total.	Rate to total population. (Per 10,000.)
1884.....	6	1	3	14	8	21	52	61	34	4	204	5.68
1885.....	2	1	4	12	16	26	44	69	30	2	206	5.69
1886.....	2	1	1	12	16	24	48	81	32	3	220	6.03
1887.....	3	....	5	11	14	24	56	53	43	1	210	5.71
1888.....	4	....	3	6	12	19	59	75	64	1	243	6.55
1889.....	2	....	6	4	16	43	65	74	48	1	259	6.93
1890.....	1	1	3	6	19	38	58	82	50	5	263	6.98
1891.....	7	1	8	10	22	31	61	90	49	4	283	7.44
1892.....	....	....	1	5	20	50	73	93	57	9	308	8.03
1893.....	3	....	5	9	21	37	82	108	61	5	331	8.55
1894.....	2	1	3	4	12	42	79	105	44	2	294	7.53
1895.....	1	2	6	9	16	45	67	112	59	4	321	8.15
1896.....	2	....	5	8	21	52	90	116	59	4	357	8.98
1897.....	3	....	9	8	15	48	76	104	77	5	345	8.60
1898.....	4	....	4	7	20	53	73	112	68	2	343	8.48
1899.....	2	2	4	9	30	53	83	126	63	4	376	9.21
1900.....	2	1	6	7	18	55	87	105	72	9	362	8.79
1901.....	1	2	4	13	28	38	92	102	58	2	340	8.18
1902.....	12	....	5	5	25	53	105	136	67	4	412	9.83
1903.....	10	2	8	14	35	63	99	117	81	2	431	10.20
1904.....	13	1	2	13	25	66	97	126	82	5	430	10.09
1905.....	9	5	3	11	30	61	122	125	84	3	453	10.54
1906.....	8	3	7	7	27	63	95	147	85	4	446	10.28
1907.....	11	1	7	11	26	71	133	158	101	4	523	11.96
Total .....	110	25	112	215	492	1,076	1,896	2,377	1,468	89	7,960	.....

Table No. 65.

Deaths from Bright's Disease by Age Periods, 1884 to 1907, inclusive.

Years.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Not stated.	Total.	Rate to total population. (Per 10,000.)
1884	6	6	9	13	12	23	20	23	3	2	117	3.26
1885	6	9	11	19	15	14	24	24	7	1	130	3.59
1886	3	2	9	8	8	10	28	33	6	1	108	2.96
1887	4	6	6	17	12	16	29	25	6	1	122	3.31
1888	9	3	6	3	15	20	25	25	5	2	113	3.04
1889	3	3	11	16	19	28	34	33	8	1	156	4.17
1890	5	5	5	14	16	24	35	39	11	3	157	4.16
1891	2	9	7	18	16	27	46	34	10	5	174	4.57
1892	7	6	10	16	24	35	37	36	9	3	183	4.77
1893	13	7	10	18	18	18	29	39	7	....	159	4.11
1894	10	6	14	12	20	24	22	30	6	1	145	3.71
1895	4	8	13	17	23	37	34	38	13	1	188	4.77
1896	6	10	9	18	17	32	39	43	15	2	191	4.80
1897	15	3	11	24	15	38	46	56	20	4	232	5.78
1898	5	7	16	16	15	35	51	65	16	3	229	5.66
1899	11	6	12	16	23	31	50	71	21	1	242	5.93
1900	12	5	15	14	34	35	49	61	20	3	248	6.02
1901	7	5	15	22	26	47	57	44	17	2	242	5.82
1902	8	4	19	20	33	43	64	77	25	4	297	7.09
1903	8	8	18	23	39	58	74	81	36	3	348	8.45
1904	6	4	19	25	34	57	67	76	45	6	339	7.95
1905	13	14	29	33	40	65	90	92	49	3	428	9.95
1906	7	9	19	29	47	67	108	93	36	5	430	9.91
1907	9	8	13	17	34	59	87	110	47	3	387	8.85
Total	179	153	306	428	555	843	1,145	1,248	438	61	5,365	.....

## FINANCIAL STATEMENT.

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### EXPENSES OF THE DEPARTMENT OF VITAL STATISTICS,

*September 1, 1906, to August 31, 1907.*

Clerical services . . . . .	\$883.00
Postage and express . . . . .	142.96
Stock for blanks . . . . .	106.42
Incidentals . . . . .	.25
Printing report . . . . .	1,197.17
Total . . . . .	<u>\$2,329.80</u>

### EXPENSES OF THE DEPARTMENT OF VITAL STATISTICS,

*September 1, 1907, to August 31, 1908.*

Clerical services . . . . .	\$1,195.00
Postage and express . . . . .	135.00
Stock for blanks . . . . .	98.80
Printing blanks . . . . .	107.19
Stationery and incidentals . . . . .	31.16
Total . . . . .	<u>\$1,567.15</u>





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REPORT  
OF THE  
Fish and Game Com-  
missioners

OF  
NEW HAMPSHIRE

TO THE  
GOVERNOR AND COUNCIL

SEPTEMBER, 1908.

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VOLUME III. - - PART VI.

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1908.



Gazette-Times Press

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1908

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Lancaster :: N. H.

## FISH AND GAME COMMISSIONERS' REPORT.

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*To His Excellency, the Governor, and the Honorable Council:*

The Commissioners of Fish and Game herewith submit their report.

The Commissioners are pleased to report that, although in the last two or three years we have had some very hard droughts and at the present time, June and July, are experiencing one of the most severe ever known in New Hampshire.

But for all this we are able to report the best brook trout fishing, especially in Southern New Hampshire, that we have known for twenty-five years. We account for this in this way: The United States Commission, located at Nashua, have been putting out large numbers of brook trout fry and fingerlings in about every section of the State where proper applications have been made for them. This with the large number, from a million and a half to two million brook trout fry and fingerlings put out by your Commission is the reason for the good fishing we have had.

We are firm believers in planting brook trout in the fry stage, if reliable men can be had to do the planting, in the spring feeders, to the brooks and shallow rapids. A severe drought is not always as injurious as it would at first seem, as where it kills trout it also kills many enemies to the trout, especially in the brooks of Southern New Hampshire.

The aureolus, or golden trout that are found in

Sunapee Lake and Dan Hole pond we are pleased to say, if not gaining in numbers are holding their own.

The salmon fishing in New Hampshire has not been as good for the last few years as we would like to report, although we are expecting good results in the near future.

The United States Commission planted this spring in Sunapee Lake, and other lakes suitable for salmon, a large number of the fry of the Pacific salmon. Your Commission have also been for the last four years planting in our lakes, fingerlings and yearlings of the Pacific salmon.

We have great hopes of these fish as they grow very rapidly, much more so than land-locked or Atlantic salmon. Growing in their native waters to fifty or sixty pounds. A number of these have been taken the last year from the several waters where they have been planted weighing from two to five pounds each. It is hard for the average fisherman to tell the difference between this salmon and the land-locked salmon.

Mr. Ralph Davis, whose summer home is at George's Mills, Sunapee Lake, caught one from the waters of Sunapee Lake weighing two and one-half pounds. This was sent to the United States Commission and pronounced by them to be a chinook or Pacific salmon.

The black bass are here, and to stay. It is impossible after these fish have been once established to ever get rid of them. It is true we think that there are more fishermen come to New Hampshire (and we may include the natives) to fish for black bass than any other one variety of fresh water fish. But for all that we wish that lakes that are adapted to salmon and trout could have been reserved for them and the black bass confined to selected waters by themselves.

The lake trout fishing in Lake Winnepesaukee, Assquam and Winnesquam bay has been as good as any

one could ask for. We are of the opinion that a law should be passed confining each angler to so many fish each day. This should also apply to brook trout. For instance, if twenty-five or thirty brook trout were allowed to each person a day, it would have a tendency to stop many parties fishing for numbers. This should apply to brook trout especially.

We also advise that the close season in Merrimack, Cheshire, Hillsboro and Rockingham counties commence July 1st, instead of August 1st, as at the present time, making the open season in these counties from April 1st to July 1st.

There are always more or less remarks made about tinkering or changing the fish and game laws. But right here we want to make the remark, that if there are any laws upon our statute books that require changing frequently, it is the fish and game laws, for as fish or game increase or decrease, it is policy to extend or shorten the open season when fish or game can be taken.

Our non-resident license law secured for the state quite a revenue, but nothing to what she would have received had we passed a resident license law.

At the last session of the Legislature a bill was introduced and passed the Senate unanimously, that required a resident to take out a license, costing the person one dollar. This bill failed to pass the House. The principal objection being made by parties that never hunt or fish, that it would be a burden and tax upon the poor farmer's boy. We have failed to find in our talk with different sportsmen or farmers' boys, one that objected to this tax of one dollar. This resident license law would be in many ways a benefit to your Commission, for if we had this in connection with the non-resident law, any party found hunting must have either a resident or non-resident license.

These resident licenses could be issued by the town

clerk of each town, whose duty it should be, when called upon by the Commission to give the number and name of those in their respective towns that have taken out a license. For this a clerk should receive twenty-five cents for each license issued. The remaining seventy-five cents should go to the Commission for detective and other work of the Commission.

At the present time there is no way of telling how many deer are killed in New Hampshire each season. We advise a law that would require each hunter as he kills his deer to report the fact to the town clerk who issued the license. And if he fails to do so he should be fined.

Since the last session of our Legislature many states have adopted a resident hunting license law, New York and Massachusetts being among the number. Regarding the alien license law, very few have been issued during the last two years. The clause that allows an alien to hunt without a license after taking out his first papers is all wrong. These first papers cost but a trifle and many that have taken them out since the passage of this law will never go beyond these first papers.

The deer question in Southern New Hampshire is a hard one to solve. At the last session of the Legislature the lower counties were open to deer hunting from the first to the fifteenth day of December. It was not the intention of the law that either the first or the fifteenth should be included as some claim.

Many deer were killed during the open season, but in our opinion not two-thirds as many as was claimed. There was much printed in our papers regarding the cruelty of shooting deer with buck-shot. But deer will occasionally be found wounded whether buck-shot or rifle is used.

In fact one of the worst cases that came to our notice last fall, was, where a deer had been shot with a round ball. We should judge coming from a ten gauge

gun, the ball entering the fleshy part of one ham and lodging against the skin on the opposite ham. This deer when found had evidently been wounded for several days, as the pus was running from each of the wounds.

There are many theories as to the better and more humane way of killing deer. If the men could be selected and the right calibre rifle put in their hands, no doubt, this would be the better way.

But take Hillsboro county for instance, where we have a network of steam roads, trolley roads and highways, we question if it would ever be safe to the public to allow the shooting of deer with a round ball from a smooth bore gun.

We would not advocate shortening the open season in these lower counties. For if this should be done it would cause too many hunters to be in the woods at the same time, thus creating more of a chance for accidents.

We are more than pleased to report that not one accident from hunting, where a person was killed, occurred last fall.

In our opinion but one deer should be allowed to a person. It was reported to us that a father and four sons had eight deer at one time, hanging up, that they had killed and all been legally killed.

A number of deer have been killed this summer while doing damage to crops. These cases were promptly reported to your Commission. We investigated all cases when possible. It is impossible to do much with deer killed in this way, as they are rarely bled and opened and dressed as they should be after they are killed.

In 1903 the Austin Corbin heirs presented the State eight cow and four bull elk. These were liberated in the town of Andover, on the foot hills of Ragged mountain. During the last season forty-six have been seen, showing a wonderful increase. Of this number four have been killed that we know of. Three were shot wantonly and



let lay where they fell, doing no one any good. One was killed by Mr. Carr of Andover, where they had done considerable damage to fruit trees. It is only a question of time when the elk will become extinct.

An extract from *Forest and Stream* says:

"There are elk still on Vancouver Island and on the British Columbia mainland, in Washington, Oregon and a few in California. In all these localities they are few and fast diminishing, except perhaps in Washington and California, where special efforts have been made for their protection." (Editor.)

At Corbin Park they are not considered desirable, we understand, as they are gross feeders, and no where near as gamey an animal as the wild boar or deer.

The open season for game birds in New Hampshire of 1907 so far as ruffed grouse (commonly called partridge) is concerned, was very unsatisfactory.

Many theories are advanced as to the cause. During the last fifty years we have known of many seasons when grouse were very scarce, but nothing compared with last fall. The snaring of grouse in New Hampshire is a thing of the past, we are pleased to say. In our opinion there was a combination of causes, first, a cold wet time about their hatching time. Then there was more goshawks with us the winter of 1906 and 1907 than we have ever known before. One taxidermist of our acquaintance had fifty to mount, where it is uncommon for him to receive more than four or five during the same time.

This hawk is a winter hawk and very destructive to game. As a rule we do not believe in a bounty, but if a bounty of one dollar each could be paid by the state for killing this bird it would be money well invested. Then we have the house cat that in many cases has become virtually wild, living in the woods most of the time and

killing the old and young of all kinds of game it can master.

The red squirrel is one of the worst nuisances we have. It not only eats the eggs of birds and their young, but is a nuisance in many ways. You have only to go into a pine forest, the most valuable growth in New Hampshire, (both for lumber and as a protection for game during our severe winters) to find piles of pine cones of a bushel or more in a heap that they take the seed from, thus depriving the surrounding section of this valuable seed to replant our lands.

But after the open season on game birds had closed the deer hunters who tracked the deer through sprout lands, (where the bird hunter rarely goes) report starting quite a number of partridge, so that we are in hopes this beautiful bird may recover and be with us again in goodly numbers.

The wood cock seems to be on the gain if anything. The last three seasons were the best we have had in years. We account for this in a measure by the good work the Audubon Society is doing in the South as well as better laws for their protection North.

Frank P. Brown of Whitefield was appointed June 30th, 1908, to succeed Merrill Shurtleff of Lancaster.

N. WENTWORTH,	} Commissioners
CHAS. B. CLARKE,	
FRANK P. BROWN,	
	of
	Fish and Game.

## PROSECUTIONS.

---

Eighteen convictions for illegal killing of deer.

Seven convictions for illegal killing game birds and animals.

Four convictions for illegal killing song birds and taking their eggs.

Fourteen convictions for dumping sawdust into streams and lakes.

Fifteen convictions for non-residents hunting without a license.

Two convictions for illegal trapping and hunting with a ferret.

## DISTRIBUTION OF FRY AND FINGERLINGS.

1907

### LACONIA STATION.

#### BROOK TROUT FRY

Streams in town of	Tilton	-	-	-	10,000
"	"	Northfield	-	-	10,000
"	"	Epsom	-	-	10,000
"	"	Pittsfield	-	-	20,000
"	"	Franklin	-	-	10,000
"	"	Deerfield	-	-	10,000
"	"	Raymond	-	-	10,000
"	"	Dover	-	-	20,000
"	"	Manchester	-	-	40,000
"	"	Concord	-	-	40,000
"	"	Keene	-	-	50,000
"	"	Milford	-	-	20,000
"	"	Wilton	-	-	20,000
"	"	Hancock	-	-	10,000
"	"	Gilford	-	-	10,000
"	"	Somersworth	-	-	10,000
"	"	Nelson	-	-	10,000
"	"	Marlow	-	-	10,000
"	"	Hillsborough	-	-	15,000
"	"	Peterboro	-	-	15,000
"	"	Newport	-	-	10,000
"	"	Goshen	-	-	10,000
"	"	Claremont	-	-	30,000
"	"	Belmont	-	-	5,000
"	"	Sunapee	-	-	10,000
"	"	New London	-	-	30,000

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Streams in town of	Andover	-	-	-	-	10,000
"	"	Lebanon	-	-	-	20,000
"	"	Grafton	-	-	-	40,000
"	"	Canaan	-	-	-	10,000
"	"	Wentworth	-	:	-	10,000
"	"	Haverhill	-	-	-	10,000
"	"	Sandwich	-	-	-	15,000
"	"	Melvin Village	-	-	-	10,000
"	"	Boscawen	-	-	-	10,000
"	"	Candia	-	-	-	10,000
"	"	Hudson	-	-	-	10,000
"	"	Harrisville	-	.	-	10,000
"	"	Suncook	-	-	-	10,000
"	"	Allenstown	-	-	-	10,000
"	"	Northwood	-	-	-	10,000
"	"	Jaffrey	-	-	-	10,000
"	"	Antrim	-	-	-	10,000
"	"	Hill	-	-	-	10,000
"	"	Bristol	-	-	-	20,000
"	"	Waterville	-	-	-	20,000
"	"	Campton	-	-	-	10,000
"	"	Windham	-	-	-	10,000

## BROOK TROUT FINGERLINGS

Streams in town of	Nashua	-	-	-	-	2,000
"	"	Keene	-	-	-	1,000
"	"	Candia	-	-	-	500
"	"	Raymond	-	-	-	500
"	"	Exeter	-	-	-	1,000
"	"	Pittsfield	-	-	-	1,500
"	"	Plymouth	-	-	-	1,000
"	"	Haverhill	-	-	-	1,000
"	"	Springfield	-	-	-	500
"	"	Concord	-	-	-	1,000
"	"	Wilmot	-	-	-	500
"	"	Andover	-	-	-	500
"	"	Canaan	-	-	-	1,000

REPORT OF FISH AND GAME COMMISSIONERS 233

Streams in town of Lebanon	-	-	-	-	500
“ “ Milford	-	-	-	-	2,000
“ “ Wilton	-	-	-	-	500
“ “ Sunapee	-	-	-	-	500
“ “ Newport	-	-	-	-	500
“ “ Claremont	-	-	-	-	500
“ “ Charlestown	-	-	-	-	500
“ “ Hopkinton	-	-	-	-	1,000
“ “ Hillsborough	-	-	-	-	500
“ “ Antrim	-	-	-	-	500
“ “ Hancock	-	-	-	-	500
“ “ Boscawen	-	-	-	-	500
“ “ Peterboro	-	-	-	-	1,000
“ “ Hudson	-	-	-	-	500
“ “ Keene	-	-	-	-	1,000
“ “ Walpole	-	-	-	-	500
“ “ Farmington	-	-	-	-	500
“ “ Rochester	-	-	-	-	500
“ “ Somersworth	-	-	-	-	500
“ “ Belmont	-	-	-	-	750

LAKE TROUT FRY

Munsonville Lake in town of Nelson	-	-	10,000
Winnepesaukee Lake	-	-	100,000
Newfound Lake, Bristol	-	-	50,000
Tarleton Lake	-	-	20,000
Winnisquam Lake	-	-	100,000
Asquam Lake	-	-	50,000

SALMON FINGERLINGS

Pleasant Pond	-	-	500
Penacook Lake	-	-	500
Newfound Lake	-	-	1,000
Winnepesaukee Lake	-	-	20,000
Winnisquam Lake	-	-	15,000
Sunapee Lake	-	-	12,000



1908

## LACONIA STATION

## BROOK TROUT FRY

Streams in town of Nashua	-	-	-	-	40,000
“ “ Merrimack	-	-	-	-	20,000
“ “ Manchester	-	-	-	-	60,000
“ “ Northfield	-	-	-	-	10,000
“ “ Tilton	-	-	-	-	10,000
“ “ Hancock	-	-	-	-	10,000
“ “ Marlboro	-	-	-	-	10,000
“ “ Franklin	-	-	-	-	10,000
“ “ Sanbornton	-	-	-	-	20,000
“ “ Hill	-	-	-	-	20,000
“ “ Bristol	-	-	-	-	20,000
“ “ Epsom	-	-	-	-	10,000
“ “ Northwood	-	-	-	-	20,000
“ “ Pittsfield	-	-	-	-	10,000
“ “ Newport	-	-	-	-	20,000
“ “ Mill Village	-	-	-	-	10,000
“ “ Claremont	-	-	-	-	20,000
“ “ Somersworth	-	-	-	-	20,000
“ “ Atkinson	-	-	-	-	10,000
“ “ Warren	-	-	-	-	10,000
“ “ Haverhill	-	-	-	-	10,000
“ “ Sandwich	-	-	-	-	20,000
“ “ Belmont	-	-	-	-	10,000
“ “ Laconia	-	-	-	-	10,000
“ “ Grafton	-	-	-	-	20,000
“ “ Canaan	-	-	-	-	10,000
“ “ Lebanon	-	-	-	-	10,000
“ “ Henniker	-	-	-	-	10,000
“ “ Bennington	-	-	-	-	10,000
“ “ Fitzwilliam	-	-	-	-	10,000
“ “ Wolfeboro	-	-	-	-	10,000

## LAKE TROUT FRY.

Newfound Lake	-	-	-	-	-	-	50,000
Asquam Lake	-	-	-	-	-	-	50,000
Tarleton Lake	-	-	-	-	-	-	20,000
Fitzwilliam (Forest Lake)	-	-	-	-	-	-	20,000
Winnepesaukee Lake	-	-	-	-	-	-	100,000
Winnisquam Lake	-	-	-	-	-	-	100,000

## COLEBROOK STATION

1908

## BROOK TROUT FRY

Big Diamond Pond	-	-	-	-	-	75,000
Little Diamond Pond	-	-	-	-	-	40,000
Greenough Pond	-	-	-	-	-	25,000
Streams in town of Berlin	-	-	-	-	-	25,000
“ “ Gorham	-	-	-	-	-	10,000
“ “ Shelburne	-	-	-	-	-	20,000
“ “ Bethlehem	-	-	-	-	-	10,000
“ “ Franconia	-	-	-	-	-	10,000
“ “ Littleton	-	-	-	-	-	10,000
“ “ Whitefield	-	-	-	-	-	10,000
“ “ Lisbon	-	-	-	-	-	10,000
“ “ Carroll (Fabyans)	-	-	-	-	-	10,000
“ “ Bartlett	-	-	-	-	-	10,000
“ “ Jackson	-	-	-	-	-	10,000
“ “ Conway	-	-	-	-	-	10,000
“ “ Milan	-	-	-	-	-	25,000
Mohawk River, Brown Trout Fry	-	-	-	-	-	40,000
“ “ “ “ Adult Fish	-	-	-	-	-	75

## LAKE TROUT FRY

First Connecticut Lake	-	-	:	-	-	175,000
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## FINANCIAL STATEMENT.

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### LACONIA HATCHERY.

Expense for quarter ending Feb. 28, 1907.

Paid D. H. McLinn, Supt., salary.....	\$150 00
Express and trucking.....	77 00
Coal.....	7 50
Fish meat.....	29 97
Hardware.....	3 32
Repairs on pipe.....	1 09
W. R. Eaton, labor.....	15 50
Rope.....	50
	\$284 88

Expense for quarter ending May 31, 1907.

Paid D. H. McLinn, Supt., salary.....	\$150 00
Labor and board.....	22 70
Hardware.....	1 40
Fish meat.....	46 55
Labor.....	8 23
Express and trucking.....	138 00
Labor.....	69 15
Fish eggs.....	187 50
Telephone and telegraph.....	11 40
	\$634 93

Expense for quarter ending August 31, 1907.

Paid D. G. Wentworth, Supt., salary.....	\$150 00
“ “ cash paid out.....	12 50
Telephone.....	3 15
Fish meat.....	149 85
Hardware.....	3 55

REPORT OF FISH AND GAME COMMISSIONERS 237

Paid Lumber.....	\$24 75
Express and trucking.....	19 75
D. H. McLinn.....	150 00
Rubber boots.....	10 00

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\$523 55

Expense for quarter ending Nov. 30, 1907.

Paid D. G. Wentworth .....	\$174 95
D. H. McLinn .....	118 00
Telephone .....	6 28
Fish nets .....	4 25
Fish meat.....	147 84
Lumber.....	95 30
Express and trucking.....	84 00
Coal and wood.....	38 31
Labor .....	45 56
Groceries taking fish .....	3 72
Hardware .....	8 38
Rent of boat house.....	12 00

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\$738 59

Expense for quarter ending Feb. 28, 1908.

Paid D. G. Wentworth, Supt., salary.....	\$150 00
Express and trucking.....	100 12
Telephone .....	6 15
Lumber .....	48 80
Fish meat.....	40 79
Labor and hardware... ..	51 02

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\$396 88

Expense for quarter ending May 31, 1908.

Paid D. G. Wentworth, Supt., salary.....	\$150 00
“ “ cash paid out .....	1 07
Express and trucking.....	34 50
Labor and board.....	83 96
Hardware .....	1 25
Fish meat.....	101 04

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Paid Telephone.....	\$    3 65
	<hr/>
	\$375 47
Expense for quarter ending August 31, 1908.	
Paid D. G. Wentworth, Supt., salary.....	\$150 00

COLEBROOK HATCHERY.

Expense for quarter ending Feb. 28, 1907.	
Paid A. C. Wallace, Supt., salary.....	\$150 00
Telephone.....	9 75
Stevens and Tewksbury.....	2 25
Fish meat.....	11 60
Express.....	40
W. L. Rowell .....	5 00
Wood.....	4 00
Flannel.....	1 50
	<hr/>
	\$184 50
Expense for quarter ending May 31, 1907.	
Paid A. C. Wallace, Supt., salary.....	\$150 00
"      "      cash paid out .....	65
Telephone.....	4 50
Stevens and Tewksbury.....	70
H. W. Sawyer.....	4 10
Fish meat.....	41 44
Labor.....	6 40
	<hr/>
	\$207 79
Expense for quarter ending August 31, 1907.	
Paid A. C. Wallace, Supt., salary.....	\$150 00
Wood.....	8 00
Stevens and Tewksbury.....	14 73
Coal.....	19 68
Fish meat.....	82 40
	<hr/>
	\$274 81

## Expense for quarter ending Nov. 30, 1907.

Paid A. C. Wallace, Supt., salary and cash paid out.....	\$119 29
Fish meat.....	60 04
Telephone.....	10 60
Labor.....	30 40
D. H. McLinn, Supt., salary .....	50 00
“ “ cash paid out.....	81 35
Lumber.....	1 75
Teams.....	5 50
Fish meat.....	13 52
	<hr/>
	\$372 45

## Expense for quarter ending Feb. 28, 1908.

Paid D. H. McLinn, Supt., salary .....	\$150 00
Express.....	43 71
Fish meat.....	18 24
Lumber.....	48 64
Stevens and Tewksbury.....	7 93
Teams.....	1 00
Labor.....	8 00
	<hr/>
	\$277 52

## Expense for quarter ending May 31, 1908.

Paid D. H. McLinn, Supt., salary .....	\$150 00
“ “ cash paid out.....	8 65
Labor .....	66 62
Fish meat.....	44 56
Coal.....	9 18
Hardware.....	15 00
Lumber.....	108 25
Teams.....	3 75
	<hr/>
	\$406 01

## Expense for quarter ending August 31, 1908.

Paid D. H. McLinn, Supt., salary .....	\$150 00
Total expense for two years .....	\$4977 38



### MISCELLANEOUS ACCOUNT.

1907		
Feb. 28	Care of screen Newfound Lake .....	\$ 6 25
	“      “      East Tilton .....	4 50
	G. A. R. Hall, Concord hearing.....	3 00
May 31	Carting fish.....	5 00
Aug. 23	Care of screen Newfound Lake.....	13 75
	“      “      Post Pond.....	4 35
	“      “      East Tilton.....	11 50
	Compiling game laws.....	25 00
	C. E. Shepard .....	5 25
	L. Jenks & Co.....	18 41
Dec. 1	Hilton Cross .....	15 25
	Care of screen Newfound Lake.....	14 00
1908		
Feb. 1	“      “      County Pond .....	5 00
May 31	“      “      Newfound Lake.....	20 25
	“      “      East Tilton.....	10 75
	“      “      Post Pond.....	5 00
		\$168 26

### PRINTING NOTICES.

1907		
Feb. 28	Times Publishing Co.....	\$ 2 25
	Union Publishing Co.....	3 36
May 31	“      “      “ .....	6 45
Aug. 23	“      “      “ .....	6 30
	Newport Argus.....	1 75
Dec. 1	R. W. Musgrove .....	1 00
	Barney Reporter.....	7 50
1908		
May 31	Laconia Democrat.....	3 00
		\$31 61

Salaries of the Board of Commissioners for two years ending August 31, 1908.....	\$5200 00
Personal expenses.....	1403 00
	<hr/>
	\$6603 00
Received from non-resident hunting licenses and fines from Dec. 1, 1906, to Sept. 1, 1908 .....	\$12036 00
Paid for detective service from Dec. 1, 1906, to Sept. 1, 1908.....	\$ 1571 20
Balance detective fund in state treasury Sept. 1, 1908.....	\$17983 51

## FISH SCREENS.

Spofford Lake screen authorized by Governor  
and Council.

Paid Kidder Machine Co. for screens .....	\$40 00
Freight .....	5 60
J. H. Stearns, labor.....	53 32
	<hr/>
	\$98 92



## LIST OF LAKES AND PONDS.

## LIST OF LAKES AND PONDS.

LIST OF LAKES AND PONDS IN NEW HAMPSHIRE, EXCLUSIVE  
OF THE GREAT LAKES, WINNIPESAUKEE, SUNAPEE, OSSIPEE,  
CONNECTICUT, ETC., WITH THE SIZE, CHARACTER OF THE  
BOTTOM, AND SPECIES OF FISH FOUND IN THEM.

Towns	Ponds	Ares	Bottom	Fish
Acworth .....	Cole .....	200	Rocky .....	Bass, pouts, perch, pickerel
Alstead .....	Lake Warren....	560	Mud, gravel.....	Pouts, perch, pickerel
" .....	Pirce .....	8	Gravel.....	Trout
" .....	Caldwell .....	4	Muddy .....	Pouts, pickerel
" .....	Newell .....	5	Muddy .....	Pouts, pickerel
" .....	Lilly .....	...	Muddy .....	Pouts, pickerel
" .....	Brigham .....	...	Muddy .....	Pouts, pickerel
" .....	Crane .....	8	Muddy .....	Pouts, pickerel
" .....	Converse .....	...	Muddy .....	Pouts, pickerel
" .....	Townsend .....	...	Muddy .....	Pouts, pickerel
Alton .....	Half Moon .....	320	.....	Bass (1877)
" .....	Woodman's .....	.....	.....	.....
" .....	Hill's .....	.....	.....	.....
" .....	Place's .....	.....	.....	.....
Amherst .....	Babboosic .....	300	Various.....	Perch, pickerel, bass
" .....	Little .....	2	Muddy .....	Pickerel
" .....	Diamon .....	10	Muddy .....	Pouts and pickerel
Andover.....	Bradley .....	100	Muddy .....	Pouts and pickerel
" .....	Highland Lake..	400	Various.....	Bass, perch, pouts, pickerel
" .....	Horseshoe and Andover.....	100	Muddy .....	Pickerel, perch, pouts
" .....	Elbow .....	300	Hard.....	Pickerel, perch, pouts
" .....	Cold .....	20	Muddy .....	Trout
Antrim .....	Gregg .....	100	Various.....	Bass (1873)
" .....	Dudley .....	31	Rocky .....	Perch, pouts
" .....	Tilton .....	10	Muddy .....	Eels
Auburn .....	Massabesic .....	2500	Sand, rocks .....	Bass, perch, pick'l, salmon, smelt, suckers
" .....	Little Massabesic	....	Muddy .....	Bass, perch, pick'l, salmon, smelt, suckers
Albany .....	Chocorua .....	.....	.....	.....
" .....	Whitten's .....	.....	.....	.....
Alexandria ..	Foster .....	...	Muddy .....	Pick'l, perch, pouts
" .....	Goose .....	...	Muddy .....	Pick'l, perch, pouts
Allenstown ...	Bear Hill .....	23	Muddy .....	Pickerel, horned pouts
Barnstead ....	Huntress .....	.....	.....	.....

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Barnstead.....	Brindle .....	.....	.....	.....
" .....	Suncook .....	.....	.....	Pickereel, perch, bass (1877)
" .....	Brandy .....	.....	.....	.....
Barrington.....	Swan's .....	100	.....	Horn pouts, bass
" .....	Ayer's .....	100	.....	Pick'l, pouts, bass
" .....	Round .....	90	.....	Pouts, pickerel, perch, bass
" .....	Rochester Reser- voir .....	75	.....	Pouts, pickerel, perch, bass
" .....	Ball Hill .....	50	.....	Pouts, pickerel, perch, bass
" .....	Nippo .....	10	.....	Pouts, pickerel, perch, bass
" .....	Stonehouse .....	5	.....	Pouts, pickerel, perch, bass
" .....	Badger .....	26	.....	Perch, pickerel, bass
Bath .....	Perde .....	30	.....	Perch, pickerel, bass
Belmont.....	Winnepesaukee River .....	.....	.....	Pickereel, perch, bass
" .....	Lake Winni- squam .....	.....	.....	Pickereel, perch, bass
" .....	Gioiga River .....	.....	.....	Trout
Benton.....	Long .....	.....	Muddy .....	Trout
Berlin (City) ..	Success .....	300	Sand, rocks .....	Brook trout
Bow .....	Tura .....	50	Muddy .....	Pick'r'l, perch, pouts
Boscawen.....	Long .....	300	Rocks, sand .....	Pick'r l, perch, pouts
" .....	Boyce's .....	10	Muddy .....	Pick'r'l, perch, pouts
Bradford .....	Bradford .....	275	Sand, rocks .....	Bass, trout, salmon, pickerel
" .....	Todd's .....	200	Muddy .....	Pickereel, pouts, perch, eels
Brookfield .....	Cook's .....	350	Rocky .....	Pickereel, black bass, eels
Brookline.....	Potanipus.....	160	.....	Pickereel, red perch
" .....	Lakiris .....	49	.....	Horn pouts
Canterbury.....	Clough's .....	30	Sandy .....	Pouts, bass, pick'l, barbel
" .....	Shakers (5) .....	60	.....	Pick'r'l, perch, pouts
" .....	Crane-neck .....	8	Muddy .....	Pick'r'l, perch, pouts
" .....	Forest .....	20	Muddy .....	Pick'r'l, perch, pouts
" .....	Morrill .....	20	Muddy .....	Pick'r'l, perch, pouts
" .....	Reservoir .....	35	Muddy .....	Eels, pick'r'l, perch, pouts
Canaan.....	Heart .....	1200	Sandy .....	Bass, pickerel
" .....	Goose .....	1000	Muddy .....	Bass, pick'l, pouts
" .....	Clark .....	700	Muddy .....	Pickereel, pout
" .....	Mud .....	40	Muddy .....	Pickereel, pout
" .....	Ford's .....	50	Chalky .....	Trout
Campton.....	Great Perch .....	50	Muddy .....	Perch, h. pouts
" .....	Little Perch .....	30	Muddy .....	Perch, pouts
" .....	Campton Mill Pond (artificial)	75	Muddy .....	Perch, trout, pouts
Center Harbor..	Long .....	.....	.....	.....
" .....	Bear .....	.....	.....	.....
" .....	Hawkins .....	.....	.....	.....
" .....	Otter .....	.....	.....	.....
Chatham .....	Kimball's .....	100	Mud, sand .....	Pickereel
" .....	Mountain .....	100	Rocks, sand .....	Trout
" .....	Province .....	10	Rocks, sand .....	Trout
Chesterfield ..	Spofford Lake ..	1500	White sand .....	Pike, bass, pickerel
" .....	Round .....	.....	.....	Pickereel
" .....	Baker .....	.....	.....	Pickereel
" .....	Lily .....	30	Muddy .....	Trouts, eels, pick'l
Chichester.....	Pinkfield .....	.....	.....	.....
Clarksville .....	Clarksville .....	35	Mud, gravel .....	Pickereel, pout



## 246 REPORT OF FISH AND GAME COMMISSIONERS

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Clarksville	Carr	20	Muddy	Trout
Columbia	Lime	30	Lime	No fish
"	Fish	50	Muddy	Trout, eels
Concord (City)	Penacook lake	340	Sand, rocks	Salmon, lake trout, perch, pick'l, bass
"	"			Pick'l, pouts, smelts
"	"			Perch
"	"			
Conway	Walker's	2560	Rocky	Pick'l, pouts, perch, eels
"	"			
"	Pequawket	640	Muddy	Pick'l, pouts, perch, eels
Croydon	Long			Smelt, pick'l, perch
"	Rocky			Bass, smelt
"	Governor's			Bass
"	Spectacle			
Colebrook	Mathew's	8	Muddy	Trout
Coos	Strafford	20	Muddy	Trout
"	Hoskin's	10	Muddy	Pick'l, perch, pout
"	Hoskin's (2)	10	Muddy	Pick'l, perch, pout
"	Platt's	10	Muddy	Pick'l, perch, pout
Danbury	School			Pouts, perch, pick'l
"	Pleasant			H. pout, pickerel
Danville	Long			Red roach
"	Cub	100	Muddy	Pick'l, perch, pouts
Deerfield	Pleasant	800	Sandy	Pick'l, perch, bass, pouts
"	"			
"	Pruze's	150	Muddy	Pickerel, pouts
"	Deerfield		Muddy	Pickerel
Deering	Piscataquog reservoir	300		Pick'l, perch, trout, pouts
"	Mud	50		Pick'l, perch, pout
"	Dudley	100	Rocky	Pick'l, perch, pout
"	Fulton	25	Muddy	Pick'l, perch, pout
Derry	Beaver	147	Sandy	Pick'l, bass, perch, pouts
"	"			
"	Upper Shields			
"	Lower Shields			
Dixville	Trout			Trout
"	Moose			Trout
Dorchester	Cummings	100		Pickerel, pouts
"	McCutchins	20	Sandy	Pickerel, pouts
"	Reed	25		Pickerel, pouts
"	Bryant's	20		Pickerel, pouts
"	Reservoir	40		Pickerel, pouts
Dublin	Monadnock lake	250	Sandy, rocky	Trout
"	Thorndike	300	Muddy	Pickerel, perch
"	Night	50	Muddy	Pickerel, pout
"	E. Reservoir		Muddy	Pickerel, trout
Dummer	Big Dummer	200	Gravel, sand	Pickerel, trout
"	Little Dummer	100	Gravel, sand	Pickerel, trout
"	Sessions	150	Gravel, sand	Trout, chub, suckers
Dunbarton	Gorham	75	Muddy	Perch, pick'l, pout
"	Long	80	Muddy	Perch, pick'l, pout
"	Kimball's	100	Sandy, rocky	Perch, pick'l, pout
"	Purgatory	35		Perch, pick'l, pout
Eaton	Walker		Rocky	Bass, trout, pickerel
"	Crystal Lakes	90	Sandy	Bass, trout, pickerel
"	Chase	40	Muddy	Bass, trout, pickerel
"	Elwell	25	Muddy	Bass, trout, pickerel
"	Lary		Rocky	Bass, trout, pickerel
"	Thurston		Sandy	Bass, trout, pickerel
Effingham	Province	1000		
"	Leech's			
Ellsworth	Ellsworth	100		

## LIST OF LAKES AND PONDS.—Continued.

Towns	Ponds	Acres	Bottom	Fish
Enfield.....	Mascoma Lake ..	500	Rocky .....	Bass, pick'l, perch
" .....	Crystal Lake or	350	Rocky .....	Salmon, pout, bass,
" .....	East Pond.....			lake trout, pickerel
" .....	Spectacle.....	150	Rocky .....	Pout, pick'l, perch,
" .....	George.....	50	Muddy .....	(white perch 1902)
" .....	Smith .....		Muddy .....	Pick'l, pouts, perch
Epsom.....	Chestnut.....	35	Rocky, sandy...	Pick'l, pouts, perch
" .....	Ordiorne's .....	15	Mud and sand...	Bass, pickerel, roach
" .....	Round .....	1	Mud and sand...	perch, pouts
Errol.....	Aker's.....	300	Muddy, rocky...	Bass, pickerel, roach
" .....	Long.....	10	Muddy, rocky...	perch, pouts
" .....	Round .....	15	Muddy, rocky...	Bass, pickerel, roach
" .....	Smealt.....	10	Muddy, rocky...	perch, pouts
" .....	Errol.....	10	Muddy, rocky...	Trout, pickerel
" .....	Mann .....	30	Muddy, rocky...	Trout
" .....	Bearbrook.....	75	Muddy, rocky...	Trout
" .....	Part of Winnibag Lake		Sandy, rocky...	Trout, salmon,
Epping.....	Carpenter's .....			whitefish
Fitzwilliam...	South .....	300	Sandy .....	Pouts, pick'l, bass
" .....	Seipp .....	200	Muddy .....	Pick'l, perch, b. bass
" .....	Rockwood's .....	100	Sandy.....	Pickerel, perch
" .....	Collins .....	30	Muddy .....	Pickerel, perch
Francetown...	Haunted .....	216	Sandy.....	Pick'l, perch, smelt
" .....	Pleasant.....	216	Sandy.....	Bass, perch, pick'l
Franklin.....	Webster Lake ..	100	Sandy.....	Bass, perch, pick'l
Franconia.....	Echo Lake .....			Salmon, pick'l, perch
Freedom.....	Loon Lake .....	475	Sand, gravel....	bass, h. pouts
" .....	Round .....	8	Muddy .....	Trout, bass
" .....	3 Danforth .....	250	Gravel, mud .....	Perch, pick'l, trout
" .....	Trout .....	6	Sandy.....	Perch, pick'l, h. pout
Fremont.....	Loon .....	30	Muddy .....	trout
Gilford.....	Saltmarsh.....	30	Gravel, mud .....	Perch, pickerel
" .....	Lily .....	30	Muddy .....	Trout
Gilmanton.....	Loon .....			Pickerel, h. pout
" .....	Lougee .....			Pick'l, pouts, perch
" .....	Young's.....			Pick'l, pouts, perch
" .....	Rocky.....			Black bass, pickerel
" .....	Round .....			Black bass, pickerel
" .....	Shellcamp .....			Pickerel
Gilsum.....	Converse .....	2	Muddy .....	Pickerel
Goshen.....	Rand's .....	60	Sand, gravel....	Pouts, pickerel
Grafton.....	Grafton.....	100	Sand, gravel....	Trout
" .....	Kilton's .....	100	Rocky .....	Pick'l, perch, pouts,
" .....	Tewksbury.....	50	Muddy .....	bass, trouts
" .....	Mud .....	20		Pick'l, perch, trout,
" .....	Half Moon .....	50	Sandy.....	pout, bass
Graham.....	Stocker .....	140	Mud, sand.....	Bass, pout, pickerel
" .....	Eastman .....	700	Mud, sand.....	Perch, pick'l, pouts
" .....	Anderson .....	35	Mud, sand.....	(Rainbow 1903)
" .....	Butternut .....	160	Mud, sand.....	Pouts, pickerel
				Pouts, pickerel
				Trout, perch, pouts,
				pickerel
				Trout, perch, pouts,
				pickerel
				Trout, perch, pouts,
				pickerel

## 248 REPORT OF FISH AND GAME COMMISSIONERS

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Grantham	Half Mile.....	40	Mud, sand.....	Trout, perch, pouts, pickerel
"	Miller.....	140	Mud, sand.....	Trout, perch, pouts, pickerel
"	Chase.....	12	Mud, sand.....	Trout, perch, pouts, pickerel
"	Lily.....	10	Mud, sand.....	Trout, perch, pouts, pickerel
"	Leavitt.....	80	Mud, sand.....	Trout, perch, pouts, pickerel
"	Grass.....	5	Mud, sand.....	Trout, perch, pouts, pickerel
Greenfield	Pollards.....	300	Mud, sand.....	Pick'l, perch, pouts
"	Gould's.....	150	Sandy.....	Pick'l, perch, pouts
"	Cragin's.....	150	Mud, sand.....	Pickerel, perch
"	Hogback.....	10	Muddy.....	Perch
"	Bridges.....	10	Muddy.....	Perch, pouts
Groton	Spectacle.....	100	Rocks, sand.....	Perch, pickerel
"	Little.....	4	Muddy.....	Perch, pickerel
Hampstead	Nash.....	250	Muddy.....	Bass, perch, pick'l, pout
"	Island.....	200	Muddy.....	Bass, perch, pick'l, pout
"	Angle.....	100	Muddy.....	Bass, perch, pick'l, pout
Hancock	Norway.....	47	Muddy.....	Perch, pick'l, pout
"	Juggernet.....	15	Rocky.....	Perch, pick'l, pout
"	Half Moon.....	60	Muddy.....	Perch, pick'l, pout
"	Hunt.....	40	Rocky.....	Perch, pick'l, pout
"	Long.....	200	Rocky, sandy.....	Perch, pick'l, pout
"	Jack.....	4		Perch, pick'l, pout
Harrisville	Harrisville.....	125	Rocky.....	Bass, perch, pick'l, pout
"	Breed.....	100	Rocky, sandy.....	Bass, perch, pick'l, pout
"	North.....	300	Rocky.....	Bass, perch, pick'l, pout
"	Mud.....		Muddy.....	Pickerel
Haverhill	Woods.....	1	Muddy.....	Perch, pouts
"	French.....	5	Sand, muddy.....	Perch, pouts
Henniker	Long.....		Muddy.....	Pickerel
"	Middle.....	50	Various.....	Pickerel
"	Upper.....	75	Various.....	Pickerel
"	Whitaker's.....	100	Various.....	Pickerel
"	Gove's.....	80	Hard.....	Pickerel
"	Pleasant.....	75	Hard.....	Pickerel
"	Buxton's.....	5	Muddy.....	Pickerel
"	Morrill's.....	30	Muddy.....	Pickerel, trout
"	Cranny Hill.....	100	Hard.....	Bass, pick'l, perch
"	Clough's.....		Muddy.....	Pickerel
"	Mud.....		Muddy.....	Pickerel
Hill	Poverty.....	3	Sandy, muddy.....	H. pout, pickerel
"	Bartlett's.....		Muddy.....	H. pout, pickerel
Hillsborough	Loon.....	150	Muddy, rocky.....	Pick'l, bass, perch, pout, trout
"	Contention.....	75	Muddy, rocky.....	Pick'l, bass, perch, pout, trout
"	Gould.....	50	Muddy, rocky.....	Pick'l, bass, perch, pout, trout
"	Ellenwoodbrooks and bog.....			Trout
Holderness	Squam Lake.....	6400	Rocks, sand.....	Salmon, trout, cusk, pickerel
"	Little Squam Lake.....	150	Rocks, sand.....	Perch, smelt, barbel, eels

# REPORT OF FISH AND GAME COMMISSIONERS 249

## LIST OF LAKES AND PONDS.—Continued.

Towns	Ponds	Acres	Bottom	Fish
Holderness.....	Oak.....	80	Muddy.....	Pick'l, pouts, perch, barbel
Hollis.....	Flint's.....	70	Mud and sand....	Pick'l, perch, pouts
".....	Long.....	50	Sandy.....	Pick'l, perch, pouts
".....	Pennichuck.....	150	Sandy, rocky....	Pick'l, bass, perch, pouts
".....	Rocky.....	75	Sandy, rocky....	Pick'l, bass, perch, pouts
Hooksett.....	Lakin's.....	200	Muddy.....	Pick'l, pouts, perch
".....	Clay.....	80	Muddy.....	Pick'l, pouts, perch
".....	Hinman's.....	15	Muddy.....	Pick'l, pouts, perch
".....	Sawyer's.....	10	Muddy.....	Pick'l, pouts, perch
".....	Ten Acres.....	5	Muddy.....	Pick'l, pouts, perch
".....	Pinnacle.....	45	Sandy.....	Pick'l, pouts, perch
Hopkinton.....	Clement's.....	300	Sandy.....	Pick'l, pouts, perch
".....	Grassy.....	100	".....	Pick'l, pouts, perch
".....	Rolfe.....	200	Mud and sand....	Pick'l, pouts, perch
".....	Smith's.....	30	Muddy.....	Pick'l, pouts, perch
Hudson.....	Otterwick.....	30	Mud and sand....	Pick'el, perch
".....	Robinson.....	50	Mud and sand....	Pick'el, perch
Jaffrey.....	Frost.....	100	Muddy.....	Eels, pouts
".....	Thorndike.....	50	Muddy, rocky....	Pick'el, pouts
".....	Gilmore.....	200	Sand, rocky.....	Pick'l, perch, pouts
".....	Long.....	400	Sand, mud.....	Eels, pouts
".....	Mud.....	".....	".....	".....
Jefferson.....	Cherry.....	300	Muddy.....	Pick'el
Kensington.....	Muddy.....	10	Muddy.....	Pouts, pick'l, perch
Kingston.....	Little.....	300	Muddy.....	Trout, perch, pick'l
".....	Great.....	600	Gravel.....	Trout, perch, pick'l
".....	Country.....	800	Gravel.....	Trout, perch, pick'l
".....	Half Moon.....	".....	".....	Perch
Lancaster.....	Martin Meadow..	300	Muddy.....	Pick'l, pouts, perch, eels
".....	Baker's.....	30	Muddy.....	Pick'l, perch, eels
".....	Blood.....	50	Muddy.....	Pick'l, pouts, perch, eels
Laconia.....	Pick'el.....	30	Muddy.....	Pick'l, pouts, perch, eels
Lee.....	Wheelwright's...	160	Gravel, mud....	Bass, perch, pouts, pick'el, eels
Lempster.....	Long.....	700	Various.....	Pick'l, perch, pouts
".....	Sand.....	500	Sand, gravel....	Pick'l, perch, bass, pouts
".....	Dodge.....	35	Muddy.....	Pick'l, flatsides, po'ts
".....	Beaver.....	10	Muddy.....	Pick'el, trout
".....	Hurd.....	25	Muddy.....	Pick'el, flatsides
".....	Duck.....	5	Muddy.....	Pick'el
Lincoln.....	Black.....	10	Muddy.....	Trout, h. pout
".....	Shoal.....	10	Muddy.....	Trout, h. pout
".....	Loon.....	50	Rocky, mud....	Trout, h. pout
Lisbon.....	Pearl Lake.....	100	Hard.....	Bass, pick'el
".....	Streeter.....	90	Muddy.....	Pick'l, suckers, eels
Littleton.....	Partridge Lake..	100	Hard.....	Bass, perch, h. pout, trout, pick'el
Litchfield.....	Darrah.....	14	Sandy.....	Pick'l, perch, pouts
".....	Rich.....	4	Sandy.....	Perch, pouts
".....	Common.....	5	Sandy.....	Perch, pouts
Londonderry.....	Kendall's.....	35	Muddy.....	Pick'l, perch, pouts
".....	Scoby's.....	10	Muddy, rocky....	".....
Loudon.....	Clough's.....	50	Gravel.....	Pick'l, perch, bass
".....	Crooked.....	25	Gravel, rocky....	Pick'l, perch, pouts
".....	Sanborn.....	".....	Muddy.....	Pick'l, perch, pouts
".....	Bog.....	".....	Muddy.....	Pick'l, perch, pouts
".....	Hot Hole.....	".....	Muddy.....	Pick'l, perch, pouts
Lyman.....	Duck No. 1.....	25	Sand, rocks.....	Bass, pick'l, barbel
".....	John Young.....	200	Rocky.....	Perch, pouts, dace

## 250 REPORT OF FISH AND GAME COMMISSIONERS

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Lyman	Dodge	100	Muddy	Dace, Pick'l, pouts
"	Round	50	Muddy	Dace, pick'l, pouts
"	Mountain			Horn pouts, trout
"	Flag			Black bass, pouts
"	The Cowin	50	Muddy	Pouts, dace, pickerel
"	Duck No. 2		Muddy	Pickerel
Lyme	Trout			Pickerel
"	Pout			Pouts
"	Reservoir	200	Sandy	Perch, pickerel
"	Mud	100	Muddy	Trout
"	Post's	200	Sandy	Bass, salmon, lake trout, pickerel
Lyndeborough	Badger	15	Muddy	Pickerel, pouts
"	Benton	25	Muddy	Pouts
Manchester	Massabesic	2500	Rocky, mud	White and yellow perch, smelt, bass, pick'l, salmon
"	Stevens	20	Muddy	Pout, carp, perch, pickerel
"	Nutts	20	Sandy	Perch, pick'l, pouts
"	Long	30	Sand, mud	Perch, pick'l, pouts
Madison	Silver Lake	1858	Sandy	Various
"	Whitten	200	Sandy	Various
"	Pea Porridge	50	Sandy	Various
"	Pequawkett	30		Various
"	Ledge	20		Various
"	Davis	15		Various
"	Elliott	100		Various
"	Oak			Various
"	Mack's	10		Various
"	Douris	15		Various
"	Round	10		
"	Blue pond	6		
"	Drew	8		
"	Danforth	5		
"	Durgin	5		
"	Mill's	8		
Marlborough	Clapp's	30	Muddy	Suckers, perch, pickerel
"	Stone	100	Rock, gravel	Suckers, p'ts, perch, shiners
"	Meeting-house	50	Muddy	Suckers, perch, pt's, shiners
"	Cummings	45	Muddy	Suckers; perch, pt's, shiners
Merrimack	Baboosic		Rocky	Pick'l, perch, pout, bass
"	Reed's	40	Gravel, mud	Pick'l, perch, pout, bass
"	Horse-shoe	20	Muddy	Pick'l, perch, pout, bass
"	Green's (private)	10	Muddy	Pick'l, perch, pout, bass
Meredith	Wickwash	700	Muddy	Pickerel, pouts
"	Kelley		Muddy	Pickerel, pouts
"	Page		Muddy	Pickerel, pouts
"	Spectacle			
"	Waukawan Lake	700	Muddy	Pick'l, perch, pouts
Milan	Meed	2	Rocky	Bass, perch, pouts, pickerel
"	Nay's	75	Muddy	Trout
"	Cedar	100	Mud, gravel	Perch, pick'l, trout
Milton	Meeting-House	200	Rocks, sand, grv'l	White perch, bass
"	Tri-Echo	1200	Rocks, sand, grv'l mud	Pickerel



# REPORT OF FISH AND GAME COMMISSIONERS 251

## LIST OF LAKES AND PONDS.—Continued.

Towns	Ponds	Acres	Bottom	Fish
Milton	Northeast	1200	Rocks, sand, gravel, mud	Perch, shiners, sm'tt pouts, suckers, eels etc.
Middleton	Reservoir	500	Sand, mud	Bass, pick'l, trout
Millsfield	Millsfield			Trout
"	Moose			Trout
"	Rock			Trout
Moultonboro	Long	400	Sandy	Pick'l, perch, horn pout
"	Berry	200	Sandy	Pick'l, perch, horn pout
Milford	Chickering or Osgood	70	Muddy	Pick'l, horn pout
"	Railroad	5	Muddy	Pickerel, horn pout
Marlow	Storm	30	Mud, sand	Pickerel, horn pout
"	Trout	6	Mud, sand	Pick'l, trout, horn pout
"	Gristin	10	Mud, sand	Trout, horn pout
"	Tinker	6	Mud, sand	Pick'l, trout, horn pout
Nelson	Long	700	Muddy	Pickerel, perch
"	Center	150	Muddy	Pickerel, perch,
"	Granite Lake	247	Sand, rocks	L. trout black bass
"	Tolman	50	Muddy	Black bass
Nashua	Round	25	Sand, muddy	Pick'l, perch, bream
New Boston	Bailey's	20	Muddy	H. pouts, pick'l, perch
"	Beard's	10	Muddy	H. pouts, pick'l, perch
"	John Brown's	6	Muddy	H. pouts, pick'l, perch
"	Marshall's	5	Muddy	H. pouts, pick'l, perch
New Durham	Shaw's	100	Gravel	H. pouts, perch
"	March's	150	Gravel and mud	H. pouts, pick'l, perch
"	Merry meeting	1050	Gravel	Salmon, L. trout, pick'l, cusk
"	Cold Rain	50	Muddy	Salmon, pickerel
"	Downing's	95	Mud and gravel	Salmon, pick'l, pout
New Hampton	Spectral	50	Muddy	Perch, pout, pick'l
"	Kelley	150	Muddy	Perch, pout, pick'l
"	Jackson	25	Gravel	Pickerel
"	Sky	5	Muddy	Pickerel, pout
New Ipswich	Pratt's	50	Muddy	Pickerel, pout
"	Hoar's	5	Rocky	Pickerel, pout
New London	Clark's	50	Muddy	Pickerel, pout
"	Messer's	100	Muddy	Pick'l, perch, pout, eels
"	Otter	125	Rocks, mud and sand	Salmon, bass, smelt, pickerel, pout, eels
"	Pleasant	800	Sandy	Bass, pickerel, eels
"	Little Sunapee	1200	Sandy	Bass, chub, eels, perch, pickerel
Northfield	Chestnut		Sandy	Pick'l, pout, suckers
"	Sandogardy			
Northwood	Suncook	400	Sand, mud	Perch, pick'l, bass, pouts
"	Harvey's	200	Muddy	Perch, pick'l, bass, pouts
"	Little Bow	100	Muddy	Perch, pick'l, bass, pouts
"	Lucas			Perch, pickerel, bass pouts
"	Jenness	300	Sandy	Perch, pickerel, bass pouts
"	Pleasant		Sandy	
"	Long		Sand and mud	
Nottingham	Pawtuckway	*	Gravel, mud	Bass, pick'l, pouts, perch, flatfish, eels

\*22,000 acres.



## 252      REPORT OF FISH AND GAME COMMISSIONERS

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Nottingham	Dollar	600	Muddy	Pick'l, pouts, perch, flats
"	Round	40	Muddy	Pick'l, pouts, perch, flats
"	Quincy	95	Muddy	Pick'l, pouts, perch, flats
"	Demeritt	40	Muddy	Pick'l, pouts, perch, flats
"	Keniston	40	Muddy	Pick'l, pouts, perch, flats
"	Little and Big Mulekin	75	Muddy	Pick'l, pouts, perch, flats
"	Cyrus	25	Muddy	Pick'l, pouts, perch, flats
"	Prescott	25	Muddy	Pick'l, pouts, perch, flats
"	Langley	30	Muddy	Pick'l, pouts, perch, flats
"	Pea Porage	40	Muddy	Pick'l, pouts, perch, flats
Newbury	Chalk	39	White chalk	Perch, pick'l, pout, cat fish
"	Todd	168	Muddy	Perch, pick'l, pout, cat fish
"	Gillingham, formerly Otter Pond on top Sunapee Mt.	14	Muddy	Perch, pick'l, pout, cat fish
"		11	Muddy	No fish
No. Hampton	Great	3	Muddy	Pickelrel
"	Mill	3	Muddy	Pickelrel
Odell	Trio			
"	Cranberry			
Orange	Orange			
Orford	Brackett's			
"	Rocky			
"	Turtle			
"	Baker's Upper			
"	Reservoir			
"	Indian			
Ossipee	White	100	Sandy	Smelt
"	Duncan	100	Sandy	Pickelrel, pouts
"	Garland's	300	Rocky	Trouts, pouts
"	Connor	500	Rocky	Trouts, pouts
"	Bean	40	Rocky	Trouts, pouts
"	Dan's Hole	500	Rocky, very deep	Trout
Pelham	Long	600	Rocks and sand	Pick'l, perch, pout
"	Sunapee	100	Rocks, mud	Pick'l, perch, pout
"	White's	50	Sand, gravel	Pick'l, perch, pout
"	Island	200	Sandy	Pick'l, perch, pout
Peterborough	Cunningham	30	Sandy	Pick'l, perch, pout
"	Pierce	10	Sandy	Pick'l, perch, pout
Piermont	Tarleton	900	Various	Trout, pick'l, bass, perch
"	Little Tarleton	50	Various	Trout, pick'l, bass, perch
"	Armington or Fellows	50	Various	Bass, pick'l, perch, bream
Pittsfield	Berry's	25	Sand, gravel	Bass, pick'l, perch, bream
"	Eaton's	8	Sand, rocks	Bass, pick'l, perch, bream
"	Wild Goose	250	Muddy	Bass, pick'l, perch, bream, pouts
"	Blake	5	Muddy	Pouts, pick'l, perch, bream

## LIST OF LAKES AND PONDS.—Continued.

Towns	Ponds	Acres	Bottom	Fish
Pittsfield .....	Horse .....	1	Muddy .....	Perch
Plainfield .....	Moses .....	40	Muddy .....	Pick'l, perch, pouts
Plymouth .....	Loon Lake .....	130	Various .....	Black bass, pickerel
Portsmouth .....	Beverley Brook ..	10	Gravel .....	Trout
Randolph .....	Safety .....	75	Muddy .....	Trout
Raymond .....	Onway Lake or Jones Pond .....	125	Mud, sand .....	Pick'l, bass, pout, eels
" .....	Smith's or Gover- nor's .....	50	Mud, sand .....	Pick'l, bass, pout, eels
" .....	Page's .....	20	Mud, sand .....	Pick'l, bass, pout, eels
" .....	Loon .....	12	Mud, sand .....	Pick'l, bass, pout, eels
" .....	Dead .....	8	Mud, sand .....	Pick'l, bass, pout, eels
Richmond .....	Sandy .....	20	Sandy .....	Perch, pick'l, pouts
" .....	Wheeler .....	50	Sand and mud ..	Perch, pick'l, pouts
Rindge .....	Long .....	1000	Various .....	Perch, pick'l, sunfish eels, shiners
" .....	Grassy .....	100	Muddy .....	Perch, pick'l, sunfish eels, shiners
" .....	Bullet .....	30	Sandy .....	Perch, pick'l, sunfish eels, shiners
" .....	Emerson .....	140	Rocky .....	Perch, pick'l, sunfish eels, shiners
" .....	Hubbard .....	300	Various .....	Same as above
" .....	Pool .....	80	Muddy .....	Pick'r'l, perch, pout, eels, shi'rs, sunfish
" .....	Perley .....	300	Rocky .....	Pick'r'l, perch, pout, eels, shi'rs, sunfish
" .....	Manomanack ..	2600	Various .....	Pick'r'l, perch, pout, eels, shi'rs, sunfish
" .....	Pecker .....	30	Rocky .....	Pick'r'l, perch, pout, eels, shi'rs, sunfish
" .....	Toitoice .....	...	Sandy .....	Pick'r'l, perch, pout, eels, shi'rs, sunfish
" .....	Reservoir .....	...	Muddy .....	Pick'r'l, perch, pout, eels, shi'rs, sunfish
Rochester .....	Ricker's .....	...	...	...
" .....	Ronia .....	...	...	Black bass
Rollinsford .....	Cochecho .....	...	...	Black bass (1868)
Rumney .....	Stinson's Lake ..	450	Sandy .....	Pick'l, perch, trout, suckers, bass
Roxbury .....	Woodward or Echo Lake .....	108	Gravel .....	Pick'l, perch, trout, suckers
" .....	Cummings .....	40	Muddy .....	Pick'l, pout, carp
" .....	Holman .....	10	Muddy .....	...
Salem .....	Captain's .....	80	Muddy .....	Pick'l, perch, pout;
" .....	World's End .....	50	Muddy .....	Pick'l, perch, pout
" .....	Hitty-Titty .....	50	Muddy .....	Pick'l, perch, pout
" .....	Canobie Lake .....	*	Rocky .....	Pick'l, perch, pout, bass
Salisbury .....	Tucker .....	75	Hard .....	Pick'l, perch, pout
" .....	Greenough .....	25	Muddy .....	Pick'l, perch, pout
" .....	Wilder .....	6	Hard .....	Pick'l, perch, pout
Sanbornton .....	Hunkin's .....	14	Various .....	Pick'l, perch, pout
" .....	Cawley .....	10	Muddy .....	Pick'l, eels, perch, pout
" .....	Drake .....	15	...	...
" .....	Spectacle .....	6	...	...
Sandown .....	Lake Phillip .....	425	Sand, mud .....	Pick'l, bass, roach, shiners, perch, flat- sides
" .....	Angle .....	60	Sandy .....	Pick'l, bass, roach, shiners, perch, flat- sides

\*300 to 500 acres.

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LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Sandown .....	Punch .....	25	Muddy .....	Pick'l, bass, roach, shiners, perch, flat-sides
" .....	Cub .....	15	Muddy .....	Same as above
" .....	Clark's .....	59	Muddy .....	Same as above
" .....	Shourells .....	8	Muddy .....	Same as above
" .....	Hunts .....	10	Muddy .....	Same as above
Sandwich .....	Bear Camp .....	400	Muddy .....	Perch, pick'l, pouts
" .....	Red Hill .....	300	Muddy .....	Perch, pick'l, pouts
" .....	Cole's .....	150	Sand, rocks .....	Perch, pick'l, pouts
Somersworth .....	Little .....			Bass (1877)
" .....	Willard's .....			Smelt
Springfield .....	Kobellernook Lk. ....	100	Sandy .....	Bass, perch, pickerel
" .....	Stark Lake .....	75	Rocky .....	Trout, bass, perch
" .....	Chalk .....	40		Bass, pouts
" .....	Colby .....	20	Muddy .....	Pickel, pouts
" .....	Morgan .....	100	Muddy .....	Pickel, pouts
Stark .....	North Lake, now called Christine Lake .....	300	Springs .....	Trout, lake salmon, eels
" .....	Smith .....		Muddy .....	Bass, pickerel, pout, trout
" .....	Pike .....	30	Muddy .....	No fish
Stewartstown .....	Back .....			Pickel
" .....	Big Diamond .....	20	Muddy .....	Trout
" .....	Small Diamond .....	75	Muddy .....	Trout
" .....	Ladd .....	8	Muddy .....	Trout
Stoddard .....	Granite Lake .....			Trout, bass, pickerel, perch
" .....	Center .....	90	Rocks, sand .....	Pouts, bass, pickerel, perch
" .....	Taylor .....		Rocky .....	Bass, pick'l, perch
" .....	Okland .....	300	Rocky .....	Bass, pick'l, perch
" .....	Mud .....	200	Muddy .....	Pouts, pick'l, perch
" .....	Stacey .....			Bass, pickerel, perch
" .....	Hutchinson .....			Bass, pickerel, perch
" .....	Wheel or Ingalls .....			Bass, pickerel, perch
" .....	Abbott .....			Pickel, perch
" .....	Scott .....			Pickel, perch
" .....	Nellie's .....			Pickel, perch
" .....	Trout .....	40		Pickel, perch
" .....	Barrett .....			Pickel, perch
Strafford .....	Bow Lake .....	1600	Rocky .....	Pouts, bass, pickerel, perch
" .....	Little Bow Lake .....	50	Mud and sand .....	Pouts
" .....	Wild Goose .....	40	Muddy .....	Pouts
" .....	Trout .....	35	Sand, rocks .....	Pouts, trout
Success .....	Success .....			
Sunapee .....	Ledge .....	300	Rocky .....	Bass, pick'l, perch
" .....	Perkins .....	250	Muddy .....	Pouts, pickerel, eels, suckers
" .....	Spectle .....	100	Muddy .....	Pickel
Sullivan .....	Bolster .....	60	Muddy .....	Pick'l, perch, pout
" .....	Chapman .....	70	Muddy .....	Pick'l, perch, pout
" .....	Ellis Reservoir .....	100	Muddy .....	Pick'l, perch, pout
Sutton .....	Blaisdell's .....	150	Muddy .....	Pick'l, perch, pout
" .....	Billings .....	25	Sandy .....	Salmon, pick'l, pout, bass
" .....	Russell .....	10	Muddy .....	Trout, pick'l, pout, bass
" .....	Keyser Lake .....	225	Muddy .....	Pick'l, perch, pout
" .....	Guild .....	100	Muddy .....	Pick'l, bass, perch, pout
" .....	Reservoir .....	150	Muddy .....	Pick'l, bass, perch, pout

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Swanzey .....	Great .....	160	Swampy .....	Pick'l, bass, perch, pout
" .....	Locke's .....	...	Various .....	Pick'l, bass, perch, pout
Shelburne .....	Moose .....	7	Muddy .....	H. pouts
Surry .....	Roger's .....	16	Muddy .....	H. pout, pickerel
" .....	Lily .....	4	Muddy .....	H. pout, pickerel
" .....	Keller (private)..	1	Muddy .....	Trout
Sangdon .....	Lily .....	40	Muddy .....	Pouts, pickerel
Tamworth .....	Great Hill .....	150	Muddy .....	Pouts, pickerel
" .....	Chocorua .....	250	Mud and sand..	Pouts, bass (1877)
" .....	Elliott .....	100	Muddy .....	Pouts, pickerel
" .....	White .....	175	Sandy .....	Pouts, pick'l, bass
" .....	Whitten .....	300	Rocky .....	Trout
" .....	Knowles .....	260	Muddy .....	Pickerel
" .....	Pequaet .....	100	Rocky .....	.....
" .....	Church .....	200	Muddy .....	Trout
" .....	Sawyer .....	100	Muddy .....	Trout
" .....	Jeem's .....	100	Muddy .....	Trout
Thornton .....	Picket Hill .....	10	Muddy .....	Trout, pouts
" .....	Conec .....	5	Muddy .....	Pouts
Tuftonborough	Lower Beech .....	.....	.....	.....
" .....	Dishwater .....	.....	.....	.....
Unity .....	Marshall .....	...	Rocks, mud .....	Pick'l, flatsides
" .....	Gilman .....	300	Gravelly .....	Pickerel, bass, trout
" .....	Cold .....	.....	.....	Flatsides, perch, trout
Wakefield .....	Great East .....	3000	Rocks .....	Pick'l, b. bass (1869)
" .....	Horn's .....	.....	.....	Pickerel, bass
" .....	Lovewell's .....	1200	Rocks .....	Pickerel, bass, trout, California salmon
Warren .....	Bagley's .....	22	Muddy .....	Pick'l, eels, perch
" .....	Bear .....	48	Rocky .....	Pickerel, pouts
" .....	Pleasant .....	20	Rocky, sand .....	Pick'l, pouts, perch, bass
" .....	Tom's .....	34	Muddy .....	Pick'l, pouts, perch
" .....	Limmons .....	30	Rocky .....	Trout, pouts
" .....	Day .....	12	Muddy .....	Pickerel, pouts
" .....	Glen .....	55	Muddy .....	Trout
" .....	Meador .....	30	Muddy .....	Pouts, suckers.
" .....	Part of Tarleton Lake .....	.....	Muddy .....	L. trout black bass
Washington .....	Island .....	400	Rocky .....	Bass, perch, pick'l, trout
" .....	North .....	50	Mud, sand .....	Bass, perch, pick'l, trout
" .....	May's .....	150	Hard .....	Bass, perch, pick'l, trout
" .....	Ashuelot .....	500	Mud, sand .....	Bass, perch, pick'l, trout
" .....	Mellen .....	180	Hard .....	Bass, perch, pick'l, trout
" .....	Half-Moon .....	85	Various .....	Bass, perch, pick'l, trout
" .....	Long .....	120	Muddy .....	Bass, perch, pick'l, trout
" .....	Ayer's .....	40	Muddy .....	.....
" .....	Bacon .....	50	Rocky, muddy .....	.....
" .....	Bear .....	4	Muddy .....	Trout
" .....	Borden .....	80	Muddy .....	Perch, pouts, trouts, pickerel
" .....	Borney .....	10	Muddy .....	.....
" .....	Brockway's .....	.....	.....	.....
" .....	Free Island .....	15	Very muddy .....	Pouts
" .....	Fletcher .....	20	Very muddy .....	.....

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LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Washington	Frog	75	Very muddy	Perch, pouts
"	Hedgehog	50	Very muddy	Suckers, pouts
"	Lang, part in Washington	400	Very muddy	Pick'l, perch, pouts bass
"	Newman	20	Very muddy	Pickrel, perch
"	Philbrick	15	Muddy	Perch, pouts
"	Smith	75	Muddy	Suckers, perch, pout
"	Trout	3	Muddy	Trout
"	Vickery	15	Very muddy	Pickrel, pouts
Webster	Long	320	Various	Bass, pick'l, perch, eels
"	Great	250	Various	Pout, perch, suckers; eels
Weare	Mt. William	128	Rocky	Bass, perch, pick'l, pout
"	Duck	50	Muddy	Pout, pickerel
"	Ferren's	40	Rocky	Pout, pickerel
"	Clough's	4		Pout, pick'l, perch
Wentworth Lo.	Wentworth			
Wentworth	Rocky	20	Sand, rocks	Trout
"	Brown's	500	Muddy, rocky	Bass, pick'l, trout, pout, eels
"	Lime	300	Mud, sand	Bass, pick'l, trout, pout, eels
Wilmot	Moony			
"	White	10	Clear	Pick'l, perch, trout, chub, suckers, pout
"	Eagle	50	Sandy	Same as above
"	Piper	40	Muddy, rocky	Pickrel, trout, pout
Windsor	White	75	Sand, rocky	Bass, pouts, perch, pickerel
"	Black	50	Muddy	Pout, pick'l, perch
"	Bagley	40	Muddy	Pout, pick'l, perch
Whitefield	Myror Lake	55	Rocks, mud	Pickrel, perch
"	Montgomery	250	Rocks, sand	Pickrel, perch
"	Little Cherry	25	Rocks, mud	Pick'l, pout, perch
"	Mud	10	Rocks, mud	Pick'l, pout, perch
"	Burns	250	Rocks, sand	Pick'l, pout, perch
"	Part of Forest Lake	500	Rocks, mud	Pick'l, pout, perch
Winchester	Humphrey's	150	Various	Pick'l, perch, pouts, eels
"	Round	8	Various	Pick'l, perch, pouts, eels
Windham	Canobie Lake	1017	Muddy	Bass, pick'l, perch, pouts, eels
"	Cobbett's	1000	Sandy	Bass, pick'l, perch, pouts, eels
"	Hititity		Muddy	Bass, pick'l, perch, pouts, eels
"	Mitchell's		Muddy	Bass, pickerel, perch pouts, eels
"	Golden		Sandy	Bass, pickerel, perch pouts, eels
"	Simpson's		Muddy	Bass, pickerel, perch pouts, eels
Woodstock	Loon	36	Various	Trout
"	Elbow	75	Various	Pick'l, pouts, trout
"	Hubbard's	30	Muddy	Pickrel
"	Russell	40	Mud, sand	Trout, pouts
"	Gordon	10	Muddy	Trout
"	Moran	20	Muddy	Trout
Wolfeborough	Lake Wentworth		Sand, rocks	Bass, cusk, salmon, perch
"	Rust	720	Sand, rock	Bass, pick'l, perch

LIST OF LAKES AND PONDS.—*Continued.*

Towns	Ponds	Acres	Bottom	Fish
Wolfeborough	Smith's .....	5120	Sand, rocks .....	Bass, pick'l, smelt
"	Beach.....	480	Sandy.....	Pick'l, perch, bass, pouts
"	" .. Crooked .....	320	Stony .....	Bass (171)
"	" .. Sargent's .....	240	Muddy .....	Pick'l, perch, pout
"	" .. Garland .....	120	Muddy .....	Pick'l, perch, pout
"	" .. Barton.....	80	Muddy .....	Pouts, eels
Waterville	Greeley Upper ..	10	Muddy .....	Brook trout
"	" .. Greeley Lower ..	5	Muddy .....	Brook trout
Walpole	Cobbins Mill .....	20	Soft .....	Pike









MESSAGE  
OF  
HIS EXCELLENCY  
HENRY B. QUINBY  
GOVERNOR OF NEW HAMPSHIRE  
TO THE TWO BRANCHES OF  
THE LEGISLATURE

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JANUARY SESSION

1909

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## GOVERNOR'S MESSAGE.

### *Senators and Representatives:*

As public servants we have assembled to provide for the continuance of good government for our state, and to initiate measures of progress which are promised and demanded, both by the advance which has already been made along many lines, and by our determination to keep abreast of our fellows in the brotherhood of states in all things which make for general prosperity.

As public servants we have given our oath to this end,—you as representing the legislative, and I the executive branch of the government. Upon each of us, therefore, rests an unavoidable share of the responsibility of whatever is done or omitted to be done in the weeks that are before us. In addition to our oath most of us have given pledges, which are equally binding, and have made declarations which are covenants with the people. I assume, therefore, that it remains chiefly for us to adjust only the natural and inevitable differences of opinion due to our numbers, in order to arrive at conclusions satisfactory alike to us and to our constituents. I therefore indulge the hope that mutual confidence and coöperation will prevail. Let us divest our minds of prejudice, and take up all questions for examination in the light of our duty, and of the best interests of the state. To such a course I pledge myself without reserve, and I feel sure that none of you will be lacking in reciprocal spirit. In this manner we shall render this session of the General Court notable in the legislative annals of our state, and through its results mark an epoch of progress for New Hampshire.



## FINANCIAL.

The financial condition of the state, considered in its relation to resources and liabilities, is fairly satisfactory. As regards the relation of current receipts and current expenditures, however, a different situation exists; for in recent years we have to record a material increase in the net indebtedness of the state.

For the fiscal year ending August 1, 1908, the treasurer reports actual receipts, exclusive of cash on hand September 1, 1907, of \$1,868,516.39; yet less than half of this sum, or only \$905,823.01 could be considered as revenue.

The total disbursements of the year were \$1,839,824.10; of which amount more than half, or \$968,589.69 was chargeable to expense. It will be seen, therefore, that the deficit for the past year amounts to \$62,766.68,—and this in a year when there was no session of the Legislature with its attendant cost for pay roll, mileage and incidental expenses.

It is apparent, then, that if the credit of the state is to be maintained, there must be an immediate and considerable increase in the revenue, unless we are prepared to abandon the existing enlightened policy in regard to our charitable, remedial, educational, and reformatory institutions, or to check the progressive and liberal spirit with which the state has of late entered upon an extended program of public improvements.

Neither of these alternatives will, I am confident, meet with general approval. No considerable number of our people begrudge the money now expended for schools, hospitals, libraries, reformatories, the National Guard, the public health, good roads, the promotion of agriculture, the extension of our summer business, the propagation of fish and game, or, indeed, any of the manifold functions which the modern state has taken to itself. On the contrary, most people would be glad to see each of these agencies for the betterment of the state's condition strengthened, extended and improved. It is in response

to this spirit, so well understood, that the people's representatives in the Legislature have appropriated the state's money to these causes, and no one of us wishes to take a backward step.

#### TAXATION.

But inasmuch as every dollar which is here appropriated from the treasury must be put there in the form of taxation, it behooves us to see to it that the fiscal reservoir be kept at least at the level of the demands made upon it, and that, too, in the manner least burdensome upon all classes of the people. This involves the consideration of problems which are somewhat complex. In the report of the Special Tax Commission, which was appointed a year ago, and whose conclusions have been in your hands for study for several weeks, you will find an illuminating discussion of the entire problem of taxation in New Hampshire, and I commend the Commission's recommendations to your thoughtful consideration.

I especially commend to you that portion of their conclusions which suggests the levying of taxation upon public service corporations at the average rate of taxation existing throughout the state, computed exclusive of the taxes upon the capital of insurance companies and the deposits in savings banks; and I trust that a law embodying this principle will soon be presented to me.

Direct taxation is an abhorrent method of securing public revenue, yet in New Hampshire, the state, the county, and the local community, be it city, town, or precinct, thus levies upon every citizen. To be sure, there are peculiarities of our laws which lighten or entirely remove the burden in some instances so far as the state is concerned; but this is an incongruity as it stands. The entire trend of modern taxation systems in all commonwealths is in the direction of the absolute elimination of the direct state tax; and in the Tax Commission's report you will find a recommendation to that end, and I would be glad to see the result attained as the Commission suggests it. I have

long entertained the belief that two most equitable and efficient means of increasing the public revenue lie in retaining in the state treasury all of the railroad taxes except that returnable to the cities and towns on account of railroad locations, and in retaining the entire savings bank tax for the benefit of the state, leaving the literary fund to be cared for by direct appropriations.

But whatever may be the form of legislation which you will employ, I urge upon you, gentlemen, as speedily as may be to send to me for signature legislation which will remedy the defects in our present system of taxation, which will distribute the public burdens equitably among all classes of corporations and citizens, and which will furnish to the state treasury the funds so sorely needed to carry forward the beneficent enterprises upon which the state is already embarked, to improve and construct enduring and attractive highways, to foster education, and, in general, to supply all legitimate demands for the state's co-operation and support.

#### THE RAILROAD FREE PASS.

The railroad free pass has been fiercely attacked as being an improper agency in political affairs. Toward the elimination of the free pass as a factor in politics, your predecessors in the Legislature of 1907 took a long step by prohibiting the acceptance and use of such favors by members of the Legislature, and by most of our public officers. Whatever remains to be done to complete the abolishment of the political free pass, I look to you, gentlemen of the Legislature, speedily to accomplish. Many forms of enactment will doubtless be suggested to you for this purpose, but there is one general guide in this matter which you will not lose sight of, I am sure. I refer to the platform declarations upon that subject. Anti-free pass legislation in line with those declarations will have my heartiest approval, and I trust that you will promptly lay it before me for signature.

## RESTRICTION OF THE LOBBY.

The lobby, so called, has found itself seriously curtailed in scope and power by changing conditions of the public mind, and it is for us to take action still further to restrict its operations. The only available means for this purpose is by enactment requiring attorneys and all other persons appearing before committees of the Legislature in a representative capacity to register their appearance in the public records of the secretary of state's office with a statement declaring in whose interest such appearance is made, together with a return of their fees and expenses. Such a law I recommend, with the further suggestion that its passage be expedited so as to render it serviceable during the session of the Legislature upon which we are now entering.

## THE DIRECT PRIMARY.

The desire for public office rarely fails to engender a contest, no matter what method is in use in securing nominations. Seldom, however, within my knowledge, has a preliminary canvass or a nominating convention been conducted in a manner so free from reasonable basis for criticism as in our state during the past summer. Nevertheless if improvements can be obtained in methods which will operate to secure greater purity and honesty and equity in the formation of party tickets, we should most assuredly avail ourselves of them. To this end the direct primary is advocated. It promises much, and hence justifies the experiment. I therefore recommend that you enact a law the effect of which will be to confine party nominations to party adherents, and to place the nomination of all elective state officers in the hands of the people.

## LIQUOR LEGISLATION.

By common consent and by unbroken practice the judgment of the Legislature has been taken as final in all matters pertaining to legislation which governs the liquor

traffic; and if it is your opinion that the law of 1903 shall be stricken from the statute books, I will complete your action with executive approval. If, however, you find no reason for making a change in the existing fundamental policy of the state in dealing with this matter, I earnestly recommend that in considering changes in the law such changes shall constantly be directed toward restricting to its minimum the use of intoxicants, and that you will not fail to provide every possible legal safeguard for the protection of those communities which vote no-license. As a means for the better enforcement of the liquor law a deputy attorney-general should be provided to carry on such work, under the direction of the attorney-general; or this duty should be imposed upon the attorney-general, as the chief of the state's solicitors, under a law prohibiting him from private practice and paying him a salary equal at least to that of members of the courts. The attorney-general acting in coöperation with the county prosecuting officers, at hand for frequent consultation by state officials, available for the guidance of committees of the General Court, etc., would be an invaluable officer, and would be able many times over to save his salary each year.

#### EDUCATION.

Under the wise and helpful leadership of the present superintendent of public instruction New Hampshire has made no inconsiderable advance in the efficiency of the public schools. Commensurate with the public means the state treasury has been opened for the advantage of the rural school and still wider coöperation of this sort is hoped for and advocated by educational leaders, as well as by those who are qualified to voice the sentiments of the rural communities. This, however, like all other plans for progressive legislation which demand money for their success, must be made to conform to the conditions of the treasury, though I have no hesitation in saying that if indebtedness is ever justifiable for a community or an individual, it is



when caused by expenditures incident to the raising of the intellectual capacity. I recommend that among the uses to which you will devote the increased revenue which it is imperative that you provide, you include an enlarged measure of assistance to the public schools in the rural districts, an increase of the facilities for furnishing trained teachers, and the extension of skilled supervision for the graded schools.

#### THE STATE COLLEGE.

This institution will soon come into full enjoyment of the Thompson fund, when the income thus assured will suffice to place it in the class of the best endowed of New England educational institutions. It has been well provided for by both state and national appropriations and I can see no pressing necessity for extraordinary expenditures by you in its behalf at the present time.

#### NORMAL SCHOOL.

The State Normal School, a pioneer in the work of training teachers, has commanded favorable attention through the excellence of its accomplishments. It should be maintained at the utmost of its efficiency and as I have intimated elsewhere, its efforts should be supplemented by those of new facilities for the training of teachers.

#### THE STATE LIBRARY.

The general interest in library development is by no means as active among our people now as it was ten or fifteen years ago, and it seems to me that the state library might be usefully employed in stimulating the public attention to this subject. The library is enriching its collections along certain lines which are desirable, and as an instrument for the advancement of genealogical and historical research is most valuable. I would suggest that some portion of the funds now provided for accessions be made available for field work by the librarian with a view



to bringing about close relations between all the libraries of the state and the state library, and for arousing a more general public interest in library work.

#### BUREAU OF LABOR.

The scope of the Bureau of Labor has been much narrowed by the limitations of the law under which it was established, and which has received no amendments since its enactment sixteen years ago. I suggest that the department, if it is to be continued as an independent bureau, be broadened in scope to meet the expectations of those who were chiefly interested in having it created.

#### LABOR.

The progress of New Hampshire from the settlement of the colony has been made by the industry of her people and the welfare of those who toil should be an object of solicitude on the part of lawmakers. After a lifetime of close experience with a manufacturing industry, I am convinced that most of the difficulties for which legislative remedy is sought may be obviated by forbearance on the part of the employer and employees, and by a general and genuine recognition on both sides of the rights of one's fellowmen. I am not, therefore, prepared to recommend specific legislation looking toward public interference in the relation between employer and employee. But, as a result of my observations, I have come to regard the trustee process as applied to laborers' wages as tending to impose suffering and unwarranted hardship upon those who are blameless, and I ask you to abolish the practice by amendment of the statute.

#### CHILD LABOR.

The laws upon our statute books relative to child labor were designed effectively to protect the children. Let us ever bear in mind that upon the children of the present

are to be laid the burdens of the future, and that their rights and privileges should be fully safeguarded, so that they shall not be robbed by violation of law, of their health and educational opportunities which are so essential a foundation for useful lives; failure to enforce the laws in regard to child labor will deprive the children of those who labor of their birthright—intelligent citizenship. I therefore strongly recommend that you not only add to the existing law anything lacking to make it thoroughly cover the subject, but that you provide that it be rigidly enforced.

#### THE EXECUTIVE DEPARTMENTS.

The executive departments of the state government are all deserving of commendation. Though paying small salaries as compared with other states, or as compared with the returns secured by the same degree of capacity in private occupation, New Hampshire has been able to command a high order of service in the various commissions and boards of trust. Their reports will soon be laid before you for information concerning the transactions of the past two years, and I commend them to your study. I suggest further that you consider whether the economical and efficient conduct of the state's affairs may not be advanced by the consolidation of some of the various boards and bureaus now pursuing independent ways. I sincerely hope that you may be able to accomplish something along this line, for it cannot be regarded other than extravagant and inefficient that we should continue to maintain and multiply individual executive agencies for the pursuit of work which may well be taken over by some of the existing departments and boards.

#### BOARD OF CHARITIES AND CORRECTIONS.

The public interest, greatly increased during the last decade, in social problems, in the prevention and correc-

tion of crime and pauperism, in wise aid to the afflicted and true kindness to the unfortunate, is represented in the machinery of the state government by the Board of Charities and Corrections. The different state institutions (except the State Hospital and State Prison), the county institutions, and the orphanages in which public charges are cared for, are visited regularly by members of the board and, as a result, many changes for the better have been made.

#### STATE HOSPITAL.

This institution easily and justly holds a place among the foremost of its kind in the country, and I invite your special attention to the report of its officers. Notwithstanding the generous appropriations which have enabled large additions to its equipment, the hospital admissions so far exceed the discharge of patients, that more room is required. I do not, however, recommend that action to this end be taken now, but I do recommend that the time for receiving patients at the hospital from the county almshouses be extended to January 1, 1913, by which time provision can be made to fulfill the purposes of the Law of 1903. From an experience of twelve years upon the Hospital Board of Trustees, I feel that I have a special knowledge of the institution's needs, and I ask you to make provision at this session for a new set of boilers to replace those which have served so well, for a new boiler house with the proper coal pockets, which will protect the inmates from the dangerous rigors of a possible breakdown in the heating system at the time of its utmost need, and also eliminate the dangers incident to the present arrangement whereby the hospital carpenter shop is located over the boiler room. There should also be a proper appropriation for necessary repairs to the hospital buildings.

## HOME FOR FEEBLE-MINDED.

The Home for Feeble-Minded is entitled to rank among the necessary institutions of our state, and should receive its generous aid. I have recently visited this school and examined it thoroughly and I recommend that appropriations be made for a laundry, kitchen, dining-room, and an additional boiler. Under capable superintendence the School for Feeble-Minded Children has made splendid progress, commensurate with the money afforded for its work.

## SOLDIERS' HOME.

The Soldiers' Home represents in part the measure of New Hampshire's appreciation for the men who did battle for the preservation of the Union. Since opening its doors it has sheltered nearly seven hundred veterans. After some twenty years of use its buildings naturally are in need of extended repairs, and because of the increasing age of the inmates, with attendant feebleness and illness, an increase in the staff of nurses will soon be necessary. The generosity of the state has never failed to respond to the needs of this institution, and I commend it to your continued good favor.

## CONSUMPTIVES' SANATORIUM.

The State Sanatorium for Consumptives, for which provision was made by the Legislature of 1905, is now under construction, and it will be your duty to provide for its maintenance. In this, as in the consideration of all other demands upon the public purse, due regard must be paid to the condition of the treasury, as well as to the urgency of the work in hand. And in this connection I cannot refrain from once more directing your attention to the fact that upon the measures which you will adopt for the supply of the treasury will depend the degree with which you will be able to enter upon the extension of desirable and necessary public activities, or the inauguration of new ones.

## RAILROAD COMMISSION.

The problem of the state's relation to its common carriers as then existing was met by the passage, in 1883, of the statute creating the present Board of Railroad Commissioners. Though but slightly amended in the meantime, this law proves upon examination to contain the essence, at least, of the necessary provisions of the widely-heralded legislation of recent years elsewhere. The spirit of the times, however, calls for the state's supervision over other public service agencies than the common carriers; and if such course is to be followed here I suggest that it be through a board created for that purpose or through adding to the present duties of the Railroad Commission the further function of exercising the power of regulation which the state possesses over all forms of public utilities. This will entail additional labors for the Board of Railroad Commissioners, and possibly should carry with it a larger salary. This, however, should not serve to prevent the suggested action, if in your opinion the general welfare is to be subserved thereby; and in any event I earnestly recommend that the existing anomalous method of compensating the Railroad Commission be done away with, and that they be paid, as are other state officers, directly from the treasury upon executive warrant.

## SAVINGS BANKS.

The savings banks of the state, as reported by the Bank Commissioners, show slight, but healthy, increase from year to year in their aggregate resources, which were on June 30, 1908, \$92,068,019.11, in their deposits and in their guaranty fund and in the number of their depositors, which was on the date named 186,610.

The detailed reports of these different institutions indicate that they are conducted with economy of expense and with wisdom of investment and management. The splendid shape in which all of the New Hampshire banks weathered



what has become known as the panic of 1907 is a matter of congratulation.

#### STATE BOARD OF AGRICULTURE.

The State Board of Agriculture is among the oldest and most useful of the departments of our state government. In addition to the usual duties devolving upon such an office, the secretary of the board has carried on a remarkably successful enterprise in the development of our summer industries.

Considering the smallness of the appropriations with which the work is carried on, the attractions and advantages of New Hampshire as a place of country residence have been wonderfully well advertised throughout the continent and even in foreign countries. From the first this work has been in charge of the secretary of the State Board of Agriculture, and has been carried on principally by correspondence and by a handsome annual publication, "New Hampshire Farms for Summer Homes." Exact figures cannot be given, but there is no doubt but that millions of dollars have been added to the wealth of New Hampshire because of its development as a state of summer homes.

#### FORESTRY.

To no state is the cause of forest conservation more important than to ours; and it so happens that forest preservation in New Hampshire is fraught with immeasurable benefit to most of our neighboring states in New England. At the recent meeting of the governors of New England states, held at Boston under the initiative of Governor Guild of Massachusetts, who is entitled to much praise for the success of the project and for the generous assistance he has given to the cause of the White Mountain Forest Reserve, an agreement was reached for a concert of action in the seeking of forestry legislation in all the New England states. The measures suggested are all reasonable in tenor and promise to increase the safety of the forest from



the most dangerous of its enemies,—fire. I commend these measures to your consideration, which I hope will be favorable.

The oft-repeated suggestion for the replacing of the present salaried member of the Forestry Commission with a State Forester will again come before you, and I recommend its adoption, and that the number of the Forestry Commission be reduced to three members.

#### INSECT PESTS.

The work of exterminating the gypsy and brown-tail moth is one upon which both the federal and state governments are engaged. New Hampshire appropriations for this purpose have been generously supplemented from the national treasury and practically all the work done in the past two years has been coöperative between the state and federal authorities. In exactly the measure with which we show a disposition to help ourselves we can expect a continuance of assistance from Washington, and prudence as well as necessity accordingly urges us to maintain the appropriation which has been made for fighting these pests. From the report of the agent to expend the appropriation you will learn of the extent and character of the work and needs of the situation. I recommend that you make provisions for continued defence against these agencies which are so destructive of the attractiveness and resources of our state.

#### FISH AND GAME.

The fish and game laws now in force in the northern New England states are strongly at variance in some instances which affect the transportation of game and food fish from one state to another for purpose of sale, and one of the subjects under consideration at the recent conference of New England governors and state officials had to do with this question. I recommend that our statutes be made uniform with those of our neighbors in this regard.

## HIGHWAY IMPROVEMENTS.

Under the legislation of the past two sessions we have been enabled to make a good beginning toward a comprehensive system of improved highways, which are largely under state control. The ocean boulevard and the principal links in what will be a central trunk line of highway from our southern border to the White Mountains constitute the chief elements in the work already done, and I am of the opinion that these projects should be brought to completion before any other ambitious plans are attempted. By means of the state aid, which is granted to the towns generally, a large measure of improvement has been accomplished in many localities, and this feature of the work should be continued. In the foregoing I have referred only to those expenditures for highway improvement which must be met from the current treasury receipts. If it is your opinion that we should use the proceeds of a bond issue for the purpose of hastening the extension of modern highways, including all of the proposed trunk systems of roads, I will supplement your action with executive approval.

## STATE BOARD OF HEALTH.

The State Board of Health through the Laboratory of Hygiene and the Bureau of Vital Statistics has largely increased its activity and usefulness in recent years. In the enforcement of the pure food law enacted two years ago, it is performing an especially helpful and valuable work. I believe this department to be conducted in a most progressive and efficient manner and I commend it to your continued favor.

## INSURANCE DEPARTMENT.

From the report of the Insurance Commissioner you will learn of the transactions of the department. Our body of laws concerning insurance is well administered and under the efficient direction of the present commissioner New

Hampshire finds itself upon a level with the foremost of other states in the matter of insurance regulations and requirements.

#### THE NATIONAL GUARD.

The recent reorganization of the New Hampshire National Guard in accordance with the requirements of the national legislation known as the Dick Bill seems to have had favorable effect in an increased efficiency of the whole brigade and a higher standard for the individual soldier.

New Hampshire has fully complied with the provisions of this law. At the present time the New Hampshire National Guard is composed of twenty-three infantry companies, one battery of field artillery, one company of cavalry, a signal corps and a general staff corps, which includes the adjutant-general's department, the inspector-general's department, the medical department and hospital corps, the judge-advocate-general's department, the quartermaster's department, the commissary department, a pay department, and an ordnance department, and the strength of the Guard is as follows: 134 commissioned officers and 1,583 enlisted men, being five officers and 111 men less than the maximum allowed by the state law.

#### CODIFICATION OF THE LAWS.

It has been twenty years since the last codification of the statutes was authorized by the legislature, and in the meantime the additions to our body of law have been numerous and bulky. It is true that private enterprise has in a measure supplied the lack, but it seems to me that the time has come to provide for the codification and revision of the Public Statutes, and I recommend that you make provision for that purpose.

#### STATE PRISON.

The changes in garb, dietary, and discipline at the State Prison which went into effect a few years since have been

in the line of progress, and the prison under its present management has maintained its reputation as a model institution of its kind.

#### INDUSTRIAL SCHOOL.

The Industrial School serves its purpose as well as can be expected under the circumstances attending its work. Its results may be judged by the standard of citizenship which it maintains as an ideal for its inmates. If our means were sufficient, the school, in order to attain its best results, should be reconstructed upon the cottage system, and I suggest that whatever you may provide for the school in the way of additional accommodations be planned with this idea in view.

#### INSURANCE OF STATE BUILDINGS.

The State Hospital trustees have paid the premiums for insurance from the proceeds of funds bequeathed for the benefit of the unfortunates who are under treatment. This is an injustice to the intended beneficiaries of these gifts and bequests. I recommend that you empower the Governor and Council to arrange for the proper insurance of all state property which they think requires it, or consider the advisability of the state carrying all its insurance and creating a sinking fund with which to erect structures in case of loss by fire, and also to empower the Governor and Council to authorize the construction of such buildings in case of destruction out of any money in the treasury not otherwise appropriated, until such sinking fund is adequate to replace them.

#### IN CONCLUSION.

I have not attempted to speak in detail of many of the state boards, institutions or departments. Their annual reports will be seasonably in your hands and from those pages you may learn of the things accomplished and hoped for.

In general it may be said that the state's affairs have been well managed, with little waste and with no dishonesty. Indeed, Gentlemen of the Legislature, ours is a state with a goodly heritage of renown, which it is our duty to hand over to our successors unimpaired. For myself I have sought to promise no more than I can perform; but I shall shirk no responsibility and evade no issues. To you I impute a like good purpose. Let us, therefore, coöperate with each other freely for the fulfillment in letter and in spirit of all the pledges which we have made, and thus meet the just expectations of our constituents. Fortunately none of the mooted questions before us are of a partisan nature. It is with confidence, therefore, that I bespeak your united and early attention to the problems of the session, and I trust that you may so speedily and in such wise measure accomplish the results aimed at that the period of your labors will be brief, and that the outcome will reflect credit upon all who have had to do with shaping it, while satisfying to the utmost the just demands of the people in whose name we have come together.

REPORT  
OF  
Attorney General  
OF THE  
State of New Hampshire

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1906-1908

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VOLUME I. - - PART IV.

CONCORD, NEW HAMPSHIRE,

1908.



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# Report of the Attorney-General.

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ATTORNEY GENERAL'S OFFICE.

CONCORD, N. H., December 1, 1908.

To the Legislature of New Hampshire:

The biennial report of this office is herewith respectfully submitted.

During the two years next preceding the above date the following, among other cases, have been tried or otherwise disposed of:

## INDICTMENTS FOR HOMICIDE.

At the September, 1907, term of the Superior Court for Strafford County, Elmer E. Ryan of Lowell, Mass., was indicted and tried as an accessory before the fact to the alleged killing of Katherine Ryan at Dover by one Harry H. Stackpole, on the 24th day of August, 1907. The trial resulted in the acquittal of the respondent.

At the September, 1907, term of the Superior Court for Coos County, an Italian was indicted for the murder of a fellow countryman. The respondent was represented by T. F. Johnson and J. H. Dudley of Colebrook. He offered a plea of guilty of murder in the second degree, which plea was accepted by the State, and the respondent was sentenced accordingly.

Lewis Gadwah of Colebrook was tried at the December 1907 term of the Superior Court for Coos County for the alleged murder of David Lochran at Colebrook. The respondent was represented by T. F. Johnson and Drew Jordan, Shurtleff & Morris. He was acquitted. J. Howard Wight, Solicitor, assisted on the part of the State.

Paul Emile Roy was indicted in Rockingham County for the murder of one Carkin, at Newington, N. H., in January, 1908. Roy, at the time of the alleged offense was, and is, a citizen of France. Shortly after the commission of the alleged crime and before the evidence relating to the same had been discovered, Roy went to France. After the finding of the indictment, an application for the extradition of Roy was made by the State Department at Washington. But extradition was refused upon the ground that under the laws of France, a French citizen, charged with a criminal offense, could not be surrendered to a foreign country for trial, but he must be tried, if at all, in France in accordance with the laws of that country.

There is a treaty between the United States and France with reference to extradition, but inasmuch as France denied that it was broad enough to include this case, and the evidence as to the commission of the offense was not wholly free from doubt, it has so far not been deemed best to press the extradition proceedings with France, although facts may be discovered which will in the future lead to such a result.

There are, now, four homicide cases in which indictments have been found, that are to be disposed of by trial or otherwise at the coming trial terms in Rockingham, Strafford, Coos and Cheshire Counties.

#### ARSON.

John Patten of Wilmont was indicted at the November, 1908, term of the Superior Court for Sullivan County and tried for an attempt to set fire to the buildings of Berton E. Sanborn in Springfield, N. H., in the night time of the 2nd day of July, 1908. Respondent was convicted and duly sentenced to the State Prison. He was defended by J. M. Barton. The Solicitor for Sullivan County, Frank O. Chellis, assisted on the part of the State.

## PROSECUTIONS FOR ILLEGAL SALES OF LIQUOR.

This office since Dec. 1, 1906, has received one hundred and five complaints for the alleged illegal sale of spirituous and intoxicating liquor. These complaints have all been investigated, and in communities where there has been an honest purpose to stop the illegal traffic, the results have been good. In my former report, attention was called to the mischief done in no license territory by the delivery therein of intoxicating liquors purchased in licensed towns and cities. There is also good reason to believe that large quantities of liquor are brought into this state by the express companies and delivered directly to the consumer. This last condition appears to be difficult to meet, but every legitimate effort to prevent the distribution of liquor in this way should be made. Existing laws have, so far, been found to be inadequate for this purpose, hence the need of further legislation upon this subject.

## CIVIL SUITS.

## STATE V. COTE &amp; ALS.

At the time of my last report this case was pending in the Supreme Court. It involved certain questions of law respecting the validity, as a defense, of certain matters set forth in the affidavit, for a continuance of the case. The court held the affidavit to be insufficient and ordered judgment for the State.

## BERRY &amp; ALS. V. LITTLE &amp; ALS.

Bill in equity in which plaintiffs asked to have the judgment of the License Commissioners, declaring certain bonds forfeited, set aside. The State demurred to the bill and the Supreme Court ordered judgment for the State.

## UNITED STATES FIDELITY &amp; GUARANTY CO.

v.

STATE BOARD OF LICENSE COM. &amp; ATTORNEY GENERAL.

This case is still in the hands of the court.

## STATE v. JOHN G. MULLIGAN &amp; ALS.

In this case defendants raised the question of the constitutionality of the license law. The Supreme Court held the law to be constitutional. See case in N. H. Reports, Vol. 74.

## THOMPSON v. KIDDER.

Pending at the time of my last report, has been decided by the Supreme Court, giving important interpretations to the law taxing collateral legacies and successions.

## STATE v. CERTAIN NATIONAL BANKS.

Informations filed by the Attorney General against the defendants to recover forfeitures for alleged violations of Ch. 112 of the Laws of 1907 entitled "An Act relative to Unauthorized Banking." Under the above named act the State claimed that defendants were prohibited from doing "a Savings Bank business." The methods adopted by the defendants fully appear in the case presented to the Supreme Court, and the substance of the opinion is, that under the law above named, National Banks can do the business described in the informations, which includes the business ordinarily done by a savings bank.

## BUSHROD W. MANN, EXR. v. STATE TREASURER.

This was an appeal by the State Treasurer from a decree of the Judge of Probate for Hillsborough County, holding that deposits in a Massachusetts Savings Bank belonging to the estate of a deceased resident of New Hampshire were not subject to the laws of New Hampshire relating to the tax upon legacies and successions

(Ch. 40 Laws of 1905). The decree of the Probate Court was sustained.

#### WYATT V. THE STATE BOARD OF EQUALIZATION.

Petition for *certiorari* to correct an alleged error on the part of defendants in assessing the tax on railroads. The Supreme Court sustained the action of the defendants, two Justices dissenting. See New Hampshire reports for full details.

#### CHANDLER & ALS. V. EASTMAN & ALS.

Petition for a mandamus by the plaintiffs who constitute the Board of Trustees of the New Hampshire State Library, against the defendants, who are the New Hampshire Printing Commission, to compel defendants in their capacity to print a certain "reference index," so called. The claim of defendants was that they were not authorized under the laws of the state to print the document referred to, and the Supreme Court so held.

#### THE NORTH POND CASE.

At the time of my last report this case (Percy Summer Club v. Joseph C. Astle & als.) was pending in the U. S. Circuit Court of Appeals. The case has since been considered by the above named court, consisting of Colt, Lowell and Brown, JJ., and has been decided in favor of the defendants. The case is one of great importance to the state, which has assumed the burden of defending it (Ch. 121 Laws 1901), and as the decision of the court will not appear elsewhere in New Hampshire reports, the opinion of the court as announced by Mr. Justice Lowell follows:

#### OPINION OF THE UNITED STATES CIRCUIT COURT OF APPEALS, May 20, 1908.

Lowell J. The complainant, a New Jersey corporation, brought in 1900 a bill in equity in the Circuit Court for the District of New Hampshire against defendant cit-



izens of New Hampshire, named and unnamed, to enjoin them from fishing in Christine Lake and from trespassing upon its shores. The complainant claims an exclusive right of fishery in the lake and an exclusive right of access to its shores. The defendants assert a right to fish existing by the common law of New Hampshire in favor of the public. The Circuit Court dismissed the bill and the complainant has appealed to this court. 145 Fed. 53. In their answer, the defendants set up that this court was without jurisdiction, because the complainant's citizenship in New Jersey was collusively acquired for the purpose of giving jurisdiction to the Federal courts; that the complainant was really a New Hampshire corporation, and so the diversity of citizenship alleged in the bill was based upon fraud. This question was little argued before us or before the Circuit Court. Considerable evidence was taken thereupon. In their supplementary brief, the defendants seem disposed to waive their objection; nevertheless we are bound to dispose of the jurisdictional question before we consider the merits of the case. If this objection of the defendants be well founded, the Circuit Court was altogether without jurisdiction of the cause, although both parties had agreed to submit thereto.

In 1883, certain persons organized a corporation under the laws of New Hampshire, styled the Percy Summer Club, to which corporation most of the land in question was duly conveyed. In 1890, the members of the New Hampshire corporation, or some of them, organized the present complainant under the laws of New Jersey, and in the same year caused to be made to the complainant a conveyance of all the real estate belonging to the original New Hampshire corporation. Other land was subsequently acquired by the complainant from other persons. In 1895, when a compromise was proposed concerning the fishery in Christine Lake, some members of the New Jersey corporation, and other per-

sons acting with them, organized a second New Hampshire corporation under the same name. This second New Hampshire corporation took by lease from the complainant the latter's real estate, but that lease was terminated in 1899. The corporate purposes of the three several corporations above mentioned were the same. The defendants contend that the court will look beneath the citizenship of the complainant in New Jersey, as established by the legal fiction which follows incorporation, and will treat the complainant, not as the veritable owner of the property here in question, but as a person who has been given a legal title thereto with the sole purpose that the real party in interest, a citizen of New Hampshire, may obtain a trial of its controversy with the defendants, also citizens of New Hampshire, in the Federal courts.

The defendants rest their contention upon *Lehigh Mining & Mfg. Co. v. Kelley*, 160 U. S. 327, which undoubtedly resembles the case at bar in some important respects. The differences between the two cases are considerable, however, and, in our judgment, they are material. The Lehigh Company was incorporated immediately before the commencement of the suit. The complainant before us was incorporated ten years before this bill was brought. In the Lehigh case, as stated by Mr. Justice Harlan, no purpose but that of gaining Federal jurisdiction was suggested by the plaintiff's incorporation. In the case at bar, most of the complainant's members were residents of New York or of places further south. Some of these men testified that the New Jersey incorporation was resorted to for the greater convenience of corporate meetings. In the Lehigh case, the Virginia corporation was held ready to accept a reconveyance from the plaintiff after the close of the litigation. In the case at bar, the New Hampshire corporation of 1883 has been neglected for many years, and the rights under its charter may well have lapsed. Except as evidence of

the intention of the members, the New Hampshire incorporation of 1895 does not concern us, being subsequent to that in New Jersey. In the Lehigh case, the plaintiff held no property except that conveyed to it by the Virginia corporation. In the case at bar, the complainant has acquired land from parties other than the New Hampshire corporation. The complainant has spent considerable sums of money upon the property. On the whole, while we may suspect that a desire to enter the Federal courts was the chief cause of the New Jersey incorporation, yet the defendants have not shown that this was the sole cause of that incorporation so clearly as to justify us in treating it as a mere subterfuge. The Circuit Court, therefore, had jurisdiction of the case.

At the argument, the defendants contended that the bill should be dismissed because the complainant had an adequate remedy at law. We do not find this objection anywhere stated in the pleadings, and we agree with the learned judge of the court below that the case was not without the jurisdiction of the Circuit Court by reason of a want of equity. We also agree with him that the controversy before us was not *res judicata* between the parties.

We come next to the merits of the case. Christine Lake is a natural lake said to contain about 140 acres, situated in the town of Stark, county of Coos and state of New Hampshire. There are several tiny streams flowing into it, and it delivers its waters through an unnavigable outlet into the Ammonoosuc River. The complainant claims title to the whole border of the lake by mesne conveyances, under grants from the English Crown made in 1773 and 1774. The complainant's paper title does not go back beyond 1834; but the earlier land records of Coos County were destroyed by fire in 1886, and we may fairly infer the loss of a deed or of a series of deeds which granted to the complainant the title and rights conveyed by the crown to the grantees

of Stratford and Percy.

The Stratford grant made by the crown to the "grantees of Stratford" in 1773 was expressed to include "all that tract or Parcell of Land situate lying and being within our said Province of New Hampshire containing by admeasurement 48603 Acres, and is to contain something more than       Miles square out of which an Allowance is to be made for high Ways and unimprovable Lands by Rocks Mountains and Rivers 2600 Acres free according to a Plan and Survey . . . butted & bounded as follows, viz." (Then followed the boundaries expressed as in an ordinary deed.) "To Have and to Hold the said Tract of Land as above expressed together with all Privileges and Appurtenances to them and to their Respective Heirs and Assigns forever by the name of Stratford, upon the following Conditions." (The conditions are immaterial.) The Percy grant of 1774 used similar language. Construed according to the common law of England, these grants passed to the grantees the fishery in Christine Lake. *Bristow v. Cormican*, 3 App. Cas. 641.

The first constitution of New Hampshire, adopted in 1784, provides that "all the laws which have heretofore been adopted, used and approved, in the province, colony, or state of New Hampshire, and usually practiced on in the courts of law, shall remain and be in full force until altered and repealed by the Legislature; such parts thereof only excepted as are repugnant to the rights and liberties contained in this constitution." In *State v. Rollins*, 8 N. H. 550, 561 (1837), the Supreme Court said: "There seems to be no reason to doubt, therefore, that the body of the English common law, and the statutes in amendment of it, so far as they are applicable to the government instituted here, and to the condition of the people, were in force here, as a part of the law of the province, except where other provision was made by express statute, or by local usage." The



defendants assert a local usage of free fishery in the ponds of New Hampshire, contrary to the common law of England. The latest decisions of the highest court of New Hampshire undoubtedly declare that this usage exists. If it does not exist, the common law is operative, and the complainant prevails. The existence or non-existence of this local usage is the principal question in the case.

The complainant's argument is this: The grants made by the crown to the "grantees of Stratford" in 1773, and to the "grantees of Percy" in 1774, though these grants made no express reference to fishery, yet passed to the grantees the title both to the waters of Christine Lake and to the fishery therein. This was the construction put upon like grants by the common law which, in 1773 and 1774, was in force in England; which was then in force in the Province of New Hampshire, and has since been established as the common law of the State by virtue of its Constitution adopted in 1784. This was the construction put by the courts of New Hampshire upon like grants until 1889, when the Supreme Court of the State overruled its former decisions and thus changed a well-established rule of property. Under these conditions the Federal courts are not bound by the latest decisions of the State courts in the construction of the grants under consideration, but, on the contrary, are bound to secure to the complainant grantee the rights conveyed by the grants as they were first construed. To establish its position, the complainant refers to *Gelpcke v. Dubuque*, 1 Wall. 175, and *Muhlker v. N. Y. & Harlem R. R.*, 197 U. S. 544. If this court does not deem the decisions rendered in New Hampshire before the grant to the complainant conclusive here in its favor, then the complainant makes the alternative contention that the Federal courts should construe the language of the grants as to them seems right, uncontrolled by the decisions of the New Hamp-

shire courts which have been rendered since the grants to the complainant were made, For this alternative contention the complainant refers to *Burgess v. Seligman*, 107 U. S. 20, and to *Roberts v. Lewis*, 153 U. S. 367. The defendants, on the other hand, rely upon the latest decisions of the New Hampshire courts.

As our decision of this case must depend largely (1) upon the course of decision in the Supreme Court of New Hampshire, and (2) upon the relation of the Federal courts to this course of decision, we must examine carefully and at some length (1) the decisions of the Supreme Court of New Hampshire concerning lakes and the fishery therein, and (2) the decisions of the Supreme Court of the United States concerning the authority which should be attributed by the Federal courts to the decisions of local courts upon the law of real estate, and upon the construction of deeds. Before dealing with the cases decided by the Supreme Court of New Hampshire, however, mention must be made of the Massachusetts ordinances of 1641 and 1647, which have affected considerably the fishery law of eastern New England, and have often been referred to by the New Hampshire court. Without some account of these ordinances, the opinions of that court could not be made intelligible.

In 1641, the Colony of Massachusetts Bay, which adjoined New Hampshire on the south, made the following provision in its Body of Liberties: "Every Inhabitant that is an howse holder shall have free fishing and fowling in any great ponds and Bayes, Coves and Rivers, so farre as the sea ebbes and flowes within the presincts of the towne where they dwell, unlesse the free men of the same Towne or the General Court have otherwise appropriated them, provided that this shall not be extended to give leave to any man to come upon others proprietic without there leave." Colonial Laws of Mass., Whitmore's ed. of 1899, p. 37, No. 16. The Massachusetts Body of Liberties is reprinted in the Laws of New



Hampshire, Vol. I, page 748, as, in the opinion of the learned editor, "made operative by colonial legislation in New Hampshire as well as in Massachusetts Bay." In 1647 the provision above quoted was amplified and amended by the General Court of Massachusetts Bay as follows: "Every Inhabitant who is an housholder shall have free fishing and fowling in any great ponds, bayes, Coves and Rivers, so farr as the Sea ebbs and flowes, within the preciects of the towne where they dwell, unless the freemen of the same Towne or the General Court have otherwise appropriated them. Provided that no Town shall appropriate to any particular person or persons, any great Pond containing more than ten acres of land, and that no man shall come upon anothers propriety without their leave otherwise then as hereafter expressed. The which clearly to determine, It is Declared, That in all Creeks, Coves and other places, about and upon Salt-water, where the Sea ebbs and flowes, the proprietor of the land adjoyning, shall have propriety to the low-water-mark, where the Sea doth not ebb above a hundred Rods, and not more wheresoever it ebbs further. Provided that such proprietor shall not by this liberty, have power to stop or hinder the passage of boates or other vessels, in or through any Sea, Creeks or Coves, to other mens houses or lands. And for great Ponds lying in common, though within the bounds of some Town, it shall be free for any man to fish and fowle there, and may pass and repass on foot through any mans propriety for that end, so they trespass not upon any mans Corn or Meddow." *Ib.* 170. This ordinance has been construed to leave fresh ponds of less than ten acres in the ownership of the riparian owners. By Stat. 1869, Chap. 384, Sects. 7, 8, the limit of private ownership in Massachusetts has been raised to twenty acres.

In *Storer v. Freeman*, 6 Mass. 435, 437, the Supreme Court of Massachusetts held that the ordinance of 1647

was "annulled with the charter by the authority of which it was made." The reference is to the forfeiture of the charter of the Colony of Massachusetts Bay in 1685. This supposed annulment of the ordinance has since been doubted by the same court. *Commonwealth v. Alger*, 7 Cush. 53; *Commonwealth v. Roxbury*, 9 Gray 451 (and the note thereon of the learned reporter, afterwards Chief Justice of the Supreme Court of Massachusetts and Associate Justice of the Supreme Court of the United States); *Litchfield v. Scituate*, 136 Mass. 39, 46; *Attorney General v. Revere Copper Co.*, 152 Mass. 444; *Watuppa Co. v. Fall River*, 154 Mass. 305; *Attorney General v. Herrick*, 190 Mass. 307; *Boston v. Le-craw*, 17 How. 426; *Shively v. Bowlby*, 152 U. S. 1, 19, 20. In *Butler v. Attorney General*, 195 Mass. 79, 82, 83, the court observed: "The ordinance is treated as settling the common law of Massachusetts, and as embodying the local law as to the *jus privatum*, which in England is represented by the Crown, and the *jus publicum*, which is there represented by the Parliament, both of which in this country are subject to the exercise of legislative power." Whatever be the precise force of the ordinance as an existing statute, several matters are well settled in connection with it: First, it expresses the law of the land then contained in the Colony of Massachusetts Bay; second, it likewise expresses the law of the land then contained within the Colonies of Plymouth and of Maine, and in the islands of Martha's Vineyard and Nantucket which then belonged to New York. In no place outside the Bay Colony did it have the force of statute law. *Barker v. Bates*, 13 Pick. 255; *Emerson v. Taylor*, 9 Greanleaf 42; *Barrows v. McDermott*, 73 Me. 441. The fishery of great ponds was thus free in Massachusetts to the south of New Hampshire, and in Maine to the north and east. From 1640 to 1679 the whole or part of the territory contained in the present state of New Hampshire was subject to the jurisdiction

of the Colony of Massachusetts Bay under circumstances and with limitations which we need not here discuss. During this period the ordinances above referred to were adopted. In several cases the Supreme Court of New Hampshire has treated the Massachusetts ordinances as having a material, though somewhat anomalous effect upon the law of New Hampshire. These cases and others relating to the right of fishery in ponds we next consider.

In *State v. Gilmanton*, 9 N. H. 461 (1838), 14 N. H. 467 (1843), the boundaries of a town were in question, described in the grant as "running \* \* \* to Winnipissiogee pond, or river that runs out of said pond \* \* \* then north to Winnipissiogee pond; then on the pond and river to meet the first line." 9 N. H. 462. As there was controversy whether the water in question was a river or something else, the court observed: "The question whether the water be a river or not, is important only upon the ground that if it be a river, the town, as it extends to the river, is bounded by the center of the stream, whereas if it strikes any large body of standing water, by whatever name it is called, it is bounded by the water's edge." 14 N. H. 478. See also 9 N. H. 463. The jury found the water in question to be a river, and the decision of the case, which deals with a political rather than a private boundary, is not in point.

In *Nudd v. Hobbs*, 17 N. H. 524 (1845), the court said that "By the union of the settlements in New Hampshire with the colony of Massachusetts, the laws of the Massachusetts colony were extended over those settlements, and justice was administered here according to the rules there prescribed. This union continued until 1679, and during that time the ordinances relating to lands bounding on the seashore would seem to have been in force here, as a part of the laws regulating the title to real property. If this be so, it may perhaps be held that the first enactment of the general assembly

of the province of New Hampshire, under the commission constituting a president and council for its government, which provided that the laws they had formerly been governed by should be a rule in judicial proceedings, so far as they would suit our constitution, and not be repugnant to the laws of England, until others were legally published, included the ordinance of 1641, so that it has been transmitted as the rule in relation to this species of property to the present day." Pages 526, 527.

In *Nudd v. Lamprey*, an unreported case, decided in 1847, referred to in *Concord Mfg. Co. v. Robinson*, 66 N. H. 1 (1889), the court held that the owner of the upland had not the exclusive right to take sea-weed from the adjoining flats. In his opinion, Chief Justice Parker said - "The court instructed the jury that the seashore belonged to the owner of the adjoining land to low water mark. If this ruling be correct, it must be because the English common law has been abrogated by the Massachusetts ordinance of 1641; but we cannot hold that that ordinance was adopted here either in practice or as law. The temporary union of this state with Massachusetts did not make that ordinance the abiding law of this state. There was no possession upon which plaintiff can maintain his action. We know of no legislation by which the ordinance of 1641 is in force here, and the counsel for plaintiff seem to admit that they do not understand how it is in force in Massachusetts and Maine." Notwithstanding this language, the ordinances continued to be noticed by the Supreme Court of New Hampshire as having some effect upon the interpretation of New Hampshire law.

*Bell v. Offutt* (1860) was a writ of entry to recover so much of the bed of Massabesic Pond as was situated adjoining and over against the plaintiff's land. After argument before the full court, and after the preparation of an opinion by Mr. Justice Fowler, which was con-



curred in by the rest of the judges, the case was settled by an entry of "neither party." It follows that Mr. Justice Fowler's opinion has not the authority attaching to an opinion of the full bench rendered in a case which has been litigated to final judgment, and so it has not been reported. Nevertheless we feel justified in referring to it as an exposition of local law made by persons chosen to interpret the laws of New Hampshire, whose pronouncement was deprived of full authority only by an act of the parties, unconnected with the opinion formed by the judges. For this history of this case we refer to the original draft of Chief Justice Doe's opinion in the Concord Mfg. Co. case, printed as an appendix to the complainant's brief in the case at bar.

Massabesic Pond is situated in Auburn, and contains about 1200 acres. The precise form of the deed in controversy in *Bell v. Offutt* was discussed in the introduction to the opinion above referred to. The judges, however, expressly rested their conclusion upon a rule of law that conveyances of the land about a navigable pond in New Hampshire do not pass title to the bed of the pond. For example, Mr. Justice Fowler said: "The lakes and large ponds of fresh water in this country are clearly navigable waters, and the dominion and property in them and the lands under them are of public right and inseparable from the power of government unless by express or explicit grant for the purpose, if at all." "Thereupon the title to the land under the navigable waters of New Hampshire, whether tide waters, lakes or ponds, revested in the crown to be holden in trust for the public as a prerogative of the government unless specially dissevered therefrom by apt words clearly expressing an intention to separate the same from the government." "Inland waters, where the public have been used to exercise a free right of passage and of fishery from the time whereof the memory of man runneth not to the contrary, are public navigable waters. Pub-

lic user is the most convincing evidence of the navigability of water—the most unfailing test to apply. \* \* \* Tried by this test, there can be no doubt, we think, that Massabesic Pond and all the large bodies of fresh water in New Hampshire are navigable. By the Colony Ordinance of 1641 in Massachusetts Ancient Charters, 148, 149, all great ponds, defined to be ponds of over ten acres in extent, were expressly declared to be public, and though lying within any town, not liable to be appropriated to any particular person or persons. It is believed that this ordinance, if not formally, was practically at least adopted as of binding force in New Hampshire by the extension of the jurisdiction of Massachusetts over our territory; at all events, the history of legislation here from the earliest organization of the government shows that the fisheries in such ponds and the streams flowing from them were regarded as of public right. There is scarcely a lake or pond of any considerable magnitude within the limits of the state which has not at one time or other been the subject of special legislative control by the prohibition of the right therein at particular seasons, and the regulation of the mode of taking fish therefrom at other times. So, too, several acts have been passed annexing islands in our lakes and ponds to the neighboring towns. Now, upon the doctrine upon which plaintiff in the present case contends, all these legislative acts were clearly usurpations—unauthorized and unjustifiable attempts by the Legislature to interfere with and control the private and exclusive rights of the owners of these lakes and ponds to the fish and islands within their waters. But in our view of the matter, these acts furnish the most conclusive evidence that these lakes and ponds were regarded, used and treated by the Legislature, both Provincial and State, as of public right—as possessing all the distinguishing characteristics of public navigable waters.” The reference to the Massachusetts Ordinances of 1641—



1647 is to be noted as indicating that the decision in *Nudd v. Lamprey* was not intended to exclude that ordinance from all effect upon New Hampshire titles.

While the conclusion in *Bell v. Offutt* was rested upon the navigability of Massabesic Lake, and that lake is several times as large as Christine Lake, yet no test of navigability in *Bell v. Offutt* was suggested which does not apply to the latter. Massabesic Lake is not comparable in size to Winnipisiogee. The opinion recognizes also the difference between a boundary upon a non-navigable fresh water stream and that upon a lake.

In *Clement v. Burns*, 43 N. H. 609, 621 (1862) a case concerned with the right of the owner of the upland to the adjoining flats, the court said: "As a rule of positive law, the ordinance of 1641 was not binding upon New Hampshire; but when we consider that a union was effected in that same year between New Hampshire, or so much of it as was then settled, and Massachusetts, which was continued for about forty years, making them practically one government, we should naturally expect that the same usages would spring up here under that ordinance." In this remark the court accepted the statement of the Supreme Court of Massachusetts in *Storer v. Freeman* that, by reason of the forfeiture of the Massachusetts charter, the ordinances of 1641 and 1647 had ceased to have any legislative force. In that respect the New Hampshire court did not distinguish between Massachusetts and New Hampshire.

In *State v. Franklin Co.*, 49 N. H. 240 (1870), the court had to consider the right of fishery in Lake Winnipisiogee now admitted to be public. The decision of the case does not concern us, but, in order to establish the freedom of the fishery, Mr. Justice Smith referred to *West Roxbury v. Stoddard*, 7 Allen 158, a case which is wholly concerned with the rule of law embodied in the Massachusetts ordinances. Considered together, these New Hampshire cases which we have already referred to

indicate, at the least, that in New Hampshire, as well as in Plymouth and in Maine, the Massachusetts ordinances concerning fresh water ponds express the present law of the land, though the basis of this law in all these places may be doubtful.

In *State v. Roberts*, 59 N. H. 256 (1879) the owner of the land surrounding Christine Lake was indicted for a violation of Chapter 55 of the Laws of 1872, which reads as follows: "No person shall catch, kill or destroy any trout" (in certain months). "This act shall not be construed to apply to any waters in which any person or persons have now by law the exclusive right to take \* \* \* trout." The court held that if there was free communication through which trout passed from the lake to the Ammonoosuc River, the State might limit the time in which trout should be caught within the lake itself; and so the case was left open for further proof. Manifestly, the decision did not cover the case at bar, but the complainant relies upon the language of the court. As this language constitutes a chief support of the complainant's case, we quote it at some length. "At common law the right of fishery in navigable waters was public and common to all, and in waters not navigable it was limited to the riparian owner of the soil, and belonged exclusively to him. \* \* \* Hence, while the riparian owner has the exclusive right of fishery upon his own land, he must so exercise that right as not to injure others in the employment of a similar right upon their lands upon the stream above and below. \*\*\* But while the legislature has power to regulate and limit the time and manner of taking fish in waters which are public breeding-places or passageways for fish, it has not assumed to interfere with the privileges of the owners of private ponds having no communication through which fish are accustomed to pass to other waters. Such ponds, whether natural or artificial, are regarded as private property, and the owners may take fish there-

from whenever they choose, without restraint from any legislative enactment, since the exercise of this right in no way inteferes with the rights of others. The legislature protects the owners of such ponds in the enjoyment of their privileges, and they are expressly excepted from the statutory restrictions by the third section of the act upon which the indictment in this case is founded. The defendent is in possession, claiming the ownership of North pond. There is no suggestion that the public have any rights in its waters other than as a breeding-place for the supply of fish to other streams, or a channel for their passage. If, as the defendent claims, the trout are within his control, and there is no communication through which they can pass from the pond to other waters, the indidtment cannot be maintained. If, as claimed in behalf of the State, there is free communication through which trout pass from the pond to the streams leading into it and to the Ammonoosuc River, the indictment can be maintained upon proof of those facts."

In *Chase v. Baker*, 59 N. H. 347 (1879), the defendant was sued for a violation of General Laws, Chap. 179, Sect. 1, since repealed, which provided that any person taking fish in any pond wholly in the control of a riparian owner and used for breeding, should be liable to a fine, to be recovered, as it seems, at the suit of the riparian owner. The court gave judgment for the defendant, observing that: "The plaintiff was not owner or lessee of all the land under or around and adjoining the pond, and cannot maintain this action." We are unable to find either in the decision or in the opinion in *Chase v. Baker* anything to support the complainant's contention. The statute gave to the owner of all the land about a breeding-pond the exclusive right of fishery therein. This is not to deny the general right of the public to fish in great ponds. In those States wherein the Massachusetts ordinances are admitted to express

the law, the right of the Legislature to grant exclusive fishery in a great pond has been recognized; *Commonwealth v. Vincent*, 108 Mass. 441.

In *State v. Roberts*, 59 N. H. 484 (1879), the defendant had been convicted of the offence charged in the case above referred to. The evidence was before the court concerning the passage of trout from Christine Lake to the Ammonoosuc River. The defendant's exceptions were overruled, and his conviction upheld. The court said in its opinion: "Subject to the right of the State to regulate the destruction or preservation of fish, their free passage, and the use of the water as a highway, the owner of the land upon unnavigable streams and inland bodies of water has therein the exclusive right of fishery. 3 Kent Com. 510,\*418; *Vinton v. Welsh*, 9 Pick. 87. The right of the legislature to enact penal laws to prevent the undue destruction of fish does not depend upon the fact that any particular body of water does not furnish a supply of fish, but upon the fact that like other wild animals they are free, and the owner of the soil under the water containing them has not on that account any property in them. The fact that the defendant owned the land around North pond gave him no exclusive property in the four trout before they were caught, unless their natural freedom had been destroyed by falling under the absolute control of the riparian owner. If the trout were not the prolific source of other trout for connecting streams, their freedom of passage to and from and through the pond prevented the defendant, a riparian owner, from acquiring property in them against the right of the State to preserve them for the enjoyment of future anglers. The fact that the fish were in water surrounded by the defendant's land, unless the water was so enclosed as to be absolutely within his control, and the free passage of the fish to and from it was entirely and rightfully obstructed, gave him no more pro-



perty in them than he would have obtained in a wild deer that came upon his land, or a wild bird that might have alighted upon it." Page 486. It will be noticed that the decision in this case did not involve the exclusive right of the riparian owner to fish in a great pond. The defendant was indicted for a violation of the game law, and his conviction was upheld. The complainant in this case does not rely upon the decision in *State v. Roberts*, but upon the language used *arguendo* by the Supreme Court. We may doubt if the court, in speaking of the exclusive rights of riparian owners, did not have in mind the exclusive rights which were so frequently given by the legislature of New Hampshire, rather than those which are based upon common law.

In *Concord Mfg. Co. v. Robertson*, 66 N. H. 1 (1889) a riparian owner upon the outlet of a great pond brought suit against another riparian owner for an unreasonable diminution of the water of the pond by the defendant's cutting ice thereon. The Supreme Court held that the agreed facts did not show "that the defendant's removal of ice was an unreasonable use of the pond, or that the plaintiffs suffered damage." The case was ordered to stand for trial. In the long opinion of the court, Chief Justice Doe discussed the title to the water of great ponds, and declared that it was in the public. Most of the cases above cited and many others there came under his careful consideration. The decision in *Concord Mfg. Co. v. Robertson* has no bearing upon the case at bar, but the language used indicates beyond a doubt an opinion favorable to the defendant before us.

In *State v. Welch*, 66 N. H. 178 (1889), the defendant was indicted for fishing in Christine Lake in 1884, contrary to General Laws, Chap. 179, Sect. 1, which read as follows: "If any person shall, at any time, catch, kill or destroy in any manner any fish in any pond, reservoir, or spring prepared or used for the purpose of

breeding, growing, or preserving the same, or from any brook or stream running through or supplying such pond or reservoir on land owned or leased for the purpose aforesaid, or shall break down any dam or embankment of the same, or shall in any way poison or pollute such water, or shall place therein any fish, or the roe, spawn, or fry of the same without permission of the owner or lessee of the land upon or through which such waters stand or flow, he shall for every such offense be fined not exceeding fifty dollars, or be imprisoned not exceeding six months, or both; provided, that said owners or lessees shall post in at least two conspicuous places on said land a notice with the words 'reserved for fish culture or preservation, trespass forbidden,' plainly painted, printed, or written thereon, and keep the same thus posted. This section shall be interpreted to apply only to such ponds, streams or springs as are wholly within the control of some person owning the land around the same, who has made some improvement or expended money or labor in stocking the same with fish for his own use." This statute had been amended by Stat. 1885, Chap. 61, which added the words "and in no case shall it apply to natural ponds." The indictment therefore charged an act which would not have been criminal if committed within four years of the time of the court's opinion. The prosecution did not rely upon the statute as giving to the riparian owners the fishery in the pond, but claimed private ownership of the pond and its fishery at common law. The court cited the Concord Mfg. Co. case and set aside the conviction, whether on the ground that the indictment was defective, that the statute was unconstitutional, that it had been amended, or that it did not apply to the case, cannot be gathered from the opinion of the court. The decision, therefore, is not clearly in point, but the court said: "One of the reserved questions was raised by the objection (presented by the defendant at the trial) that



the club had no such private right as was necessary to bring the case within the statute. Whatever view is taken of the evidence tending to show, as the State claimed, that the club owned the surrounding land, it had no tendency to show that they owned the pond. The bed of the pond was reserved, set apart, and held in trust for the public use." Page 179.

In *Percy Summer Club v. Welch*, 66 N. H. 180 (1889), the New Hampshire corporation of 1883, the complainant's grantor, brought a bill in equity to restrain the defendant from fishing in Christine Lake. Upon the authority of the two cases last cited the court held that the bill could not be maintained. In *Dolbeer v. Suncook Water Works Co.*, 72 N. H. 562 (1904), the riparian owners about a pond of fifteen acres sought damages for the appropriation of the pond. The court denied the petition on the ground that the pond was public property. These two opinions support directly the defendant's contention in the case at bar.

We have thus completed our review of the New Hampshire decisions. Read together, they show that, from the beginning, the New Hampshire court has tended to hold free the fishery in all considerable lakes and ponds, basing its action partly upon the analogy of the Massachusetts ordinances, and partly upon an appreciation of local usage. This is not the less indisputable, because the reasoning of the New Hampshire court, with all respect be it said, has not always been consistent, nor has its language been clear. Moreover, a confusion between an exclusive fishery secured to the riparian owner by the game laws and an exclusive fishery at common law has led to some overstatement about the latter, until the controversy respecting Christine Lake brought a definite statement of the law in accordance with the tendency of the earlier decisions and in favor of these defendants. It may seem strange that the ownership of the water and fishery of the numerous ponds

of New Hampshire remained so long without unequivocal and authoritative decision. But in completing our search among the neighboring States, we have found that in Vermont the ownership of the fishery in a pond appears to depend on the language of the State Constitution; *N. E. Trout Club v. Mather*, 68 Vt. 338 (1895). No decision of the Supreme Court of Rhode Island on the subject has been called to our attention. In the one case found in Connecticut there had been an express conveyance of the pond by the proprietors of the colony. *Turner v. Hebron*, 61 Conn. 175 (1891). From time to time, by special acts, the Legislature of New Hampshire has made the act of fishing in sundry ponds criminal on the part of all but riparian owners. Both complainant and defendants have based arguments upon these statutes; the former has contended that the Legislature thus recognized the private right of the riparian owner to the fishery, making the infringement of this right a crime where it had before been only a trespass; the defendants, on the other hand, have contended that these statutes manifest the authority of the Legislature to deal with the fishery in ponds. Not much weight can be attached to either argument. Where the fishery in great ponds is undoubtedly public, as in Massachusetts, the Legislature has in some cases granted an exclusive fishery to private individuals. We mention the matter here in order to show that the arguments referred to have not been overlooked.

Having followed the course of decision in the Supreme Court of New Hampshire, from its earliest reference to the Massachusetts ordinances down to its final decision of the question here involved in favor of the defendants, we have next to consider the degree to which Federal courts, having the same question before them, will follow the decisions of a State court. The matter has been considered by the Supreme Court so often that we need refer to little which is outside its reports.

The decisions of the Supreme Court which review upon writ of error the decision of a State Court upholding a statute which is alleged to impair a contract are not here in point. There the Supreme Court exercises no right of general review, but must affirm the judgment of the State court unless it contravenes the Constitution of the United States. Hence the Supreme Court in those cases neither follows nor refuses to follow the course of decisions of the State court, but, having a particular judgment of that court before it, reverses the judgment or leaves it undisturbed according as it does or does not contravene the Federal constitution. Other decisions made by the State court upon the same subject have ordinarily nothing to do with the case. *N. O. Water Works v. Sugar Co.*, 125 U. S. 18, 30; *Mobile Transportation Co. v. Mobile*, 187 U. S. 479, 491.

Where the litigation originates in a Federal court, as in the case at bar, or has been removed to it from a State court, the Federal court itself must render judgment. In so doing, it searches for precedents, and gives proper weight to those precedents which are found in the courts of that State wherein the Federal court exercises its functions. The interpretation of State statutes and of State constitutions is generally for the State courts, and the Federal courts, in their construction of these writings, ordinarily follow the construction which has been adopted by the State courts before the controversy arose. *M'Cutchen v. Marshall*, 8 Pet. 220; *Great Southern Hotel Co. v. Jones*, 193 U. S. 532. This has sometimes been done, even if an overruling of earlier decisions in the State court calls for an overruling by the Federal court of decisions which it has formerly made. *Green v. Neal's Lessee*, 6 Pet. 291; *Fairfield v. County of Gallatin*, 100 U. S. 47. But the Federal court does not yield invariably. *Rowan v. Runnels*, 5 How. 134; *Burgess v. Seligman*, 107 U. S. 20.

Where the change of opinion in the State court con-

cerns the interpretation of a State statute and results in an avoidance of contracts already entered into on the faith of the earlier decisions of the same court, the Federal court, in construing the State statute, deems itself bound to follow the earlier State decisions, so far as those contracts are concerned, but, as to contracts made since the change of decision in the State court, the Federal court follows the later decision. *Gelpeke v. Dubuque*, 1 Wall. 175. We mention the rule of *Gelpeke v. Dubuque* only because it is relied on by the complainant. We have before us no statute of New Hampshire to construe, and the case is therefore inapplicable. It is true that N. H. Stat. 1887, Chap. 86, declared the waters of all ponds over twenty acres to be public. But the decisions of the New Hampshire courts rendered since the passage of that statute have been rested expressly and altogether upon the common law.

Where the controversy before the Federal court is concerned, as here, not with the construction of State statutes, but with the construction put by the State court upon the common law, the rule is different. Certain matters have been held by the Supreme Court to appertain to general law apart from local conditions, and as to these the decisions of the courts of the State where the Federal court sits are deemed to have no peculiar authority. *Swift v. Tyson*, 16 Pet. 1. Where, however, the decision of the State court, though based upon the common law, is deemed of an application especially local, this decision is given an authority almost as great as would be assigned to it if it construed a State statute. As was said by Mr. Justice Bradley in *Burgess v. Seligman*, 107 U. S. 20, 33, 34: "Since the ordinary administration of the law is carried on by the State courts, it necessarily happens that by the course of their decisions certain rules are established which become rules of property and action in the State, and have all the effect of law, and which it would be wrong to disturb. This



is especially true with regard to the law of real estate and the construction of the State constitutions and statutes. Such established rules are always regarded by the Federal courts, no less than by the State courts themselves, as authoritative declarations of what the law is. But where the law has not been thus settled, it is the right and duty of the Federal courts to exercise their own judgment; as they also always do in reference to the doctrines of commercial law and general jurisprudence. So when contracts and transactions have been entered into, and rights have accrued thereon under a particular state of the decisions, or when there has been no decision, of the State tribunals, the Federal courts properly claim the right to adopt their own interpretation of the law applicable to the case, although a different interpretation may be adopted by the State courts after such rights have accrued. But even in such cases, for the sake of harmony and to avoid confusion, the Federal courts will lean towards an agreement of views with the State courts if the question seems to them balanced with doubt."

The case before us concerns the construction to be put upon the language of a deed. The language is of common use. The construction put upon this language, as is admitted, has varied in the States of the Union. In interpreting the language of a deed of land lying in a particular State, the interpretation put upon that language by the State court necessarily carries peculiar weight. "The question of the title of a riparian owner is one of local law." *Whitaker v. McBride*, 197 U. S. 510, 512. To decide the case before us, we need not decide if, in construing the deeds upon which the complainant relies, we are bound to follow *Concord Mfg. Co. v. Robertson and Dolbeer v. Water Works Co.*, or if we should merely "lean towards an agreement of views with the State courts if the question seems to them (the Federal courts) balanced with doubt." We need not

agree with all the reasoning of the learned chief justice in the Concord Mfg. Co. case in order to recognize that the considered decisions of the Supreme Court of New Hampshire concerning the interpretation of New Hampshire deeds are entitled to peculiar weight. As was said by that court in *Dolbeer v. Suncook Water Works Co.*, 72 N. H. 562, 563, 564: "At the December Term, 1889, three cases were decided in which the character of natural, fresh-water ponds, as to being public or private waters, was considered: *Concord Mfg. Co. v. Robertson*, 66 N. H. 1, *State v. Welch*, 66 N. H. 178, and *Percy Summer Club v. Welch*, 66 N. H. 180. In the last two cases the question was definitely raised, whether a pond containing 300 to 500 acres, situated in the midst of a tract of land belonging to a single owner, was the private property of the landowner or was public property; and it was decided that it was public property. The question was not fully discussed in these cases, but the first case was cited as authority for the decisions without additional comment, thus adopting the conclusion therein reached and the reasoning by which it was supported. If, as the plaintiff's counsel suggest the question was not before the court in the first case, and so what was said upon it should be regarded as *dictum* if the attention is fixed upon that case alone, yet when the three cases are considered together in connection with the fact that they were decided at the same term, by the same court speaking through the same judge (Chief Justice Doe), and with the further fact that the first case is cited as the authority for the decisions in the other two, it becomes apparent that the first case must be treated as authoritative on the question." Even if the cases decided before *State v. Roberts* are not in point, yet they contain many *dicta* which indicate that in the absence of an express grant from the State the fishery of a great pond is not of private ownership, and the facts in *Bell v. Offutt* are hardly distinguishable from



those in the case before us. Had it been reported, it must have affected considerably the arguments upon both sides. Therefore we find nothing which requires us to differ from the considered opinion of the Supreme Court of New Hampshire.

We agree with the Circuit Court in holding that, apart from the fishery, the interference with the complainant's rights in the borders of the pond does not warrant the interposition of a court of equity.

The decree of the Circuit Court is affirmed, and the appellees recover their costs of appeal.

We have been notified that plaintiff will not further contest the case.

#### SUITS TO RECOVER FORFEITURES IN LICENSE BOND CASES.

Since Dec. 1, 1906, this office has collected by 29 suits and turned over to the treasurer of the Board of License Commissioners \$23,865.00.

The state now holds unsatisfied judgments in four additional suits amounting to \$4,500.00, and suits are now pending and claims outstanding in twelve additional cases, some of which will go to the Supreme Court upon questions of law.

#### OPINIONS.

This office has furnished sixty-eight opinions since my last report. The space given to such opinions in former reports is at this time used for the opinion in the North Pond case.

#### EXPENSES OF THE ATTORNEY GENERAL'S DEPARTMENT.

Expenses from Dec. 1, 1906, to Aug. 31, 1907:

Salary, .....	\$1875.00
Rent and incidentals, .....	235.28
Paid for printing blanks, .....	21.15
“ “ “ report, .....	25.11
	<hr/>
	\$2156.54

Expenses from Aug. 31, 1907, to Aug. 31, 1908:

Salary, .....	\$2500.00
Rent and incidental expenses, .....	273.94
Enforcement of Liquor Law, .....	182.00
Total.....	<u>\$2955.94</u>

I have no funds in my hands belonging to the State.

#### RECOMMENDATIONS.

In order to secure a better enforcement of the laws of this state, it is my opinion that a District Police should be provided for, with powers and duties similar to those prescribed by the laws of Massachusetts for like officers. A bill authorizing the Governor and Council to appoint such officers was introduced at the 1905 session of the legislature, but failed to pass. I hope the legislature of 1909 will take a more favorable view of the subject.

The details respecting crimes, and other matters concerning which the Attorney General has to do, are found in the reports of County Solicitors and other State departments and so are not reproduced here.

Respectfully submitted,

EDWIN G. EASTMAN,

Attorney-General.







STATE OF NEW HAMPSHIRE

Report of Trustees

OF

STATE NORMAL SCHOOL

1908.

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CONCORD, N. H.:

IRA C. EVANS CO., PRINTERS.

1909.





## REPORT OF TRUSTEES

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*To the Honorable Senate and House of Representatives:*

GENTLEMEN,—As required by law, the trustees of the State Normal submit herewith their biennial report.

### EXTENSION OF COURSE.

The most important change which the board of trustees has to report is the extension of the school year so as to include a summer session of eight weeks. Teachers who are in regular service and who have not had the advantages of normal training are thus enabled to secure during vacation time its advantages. No additional appropriation for this purpose has been asked. The cost of maintenance has been met primarily by economies effected at various points in the management of the institution. With a plant in operation the greater part of the year reaching the largest possible number of students with no increase of cost to the state, the trustees submit that the institution is approaching its maximum efficiency.

### REPAIRS.

Few repairs have been made within the two years covered by this report and such as have been made have been of minor consequence. The heating and lighting plant installed during the summer of 1906 has given good service and has very materially reduced the monthly cost of coal. Of course, the plant is operated eight weeks longer than in previous years, or an increase of nearly one quarter. The trustees have under consideration plans for minor changes, which will still further improve the efficiency of the heating plant.

A suitable coal pocket ought to be constructed. At present the coal is exposed to the weather, being thus not only

subject to deterioration and waste but also an unsightly adjunct to the principal building.

An ice-house has been constructed on the dormitory lot and the ice used in the boarding department is now harvested and stored by the management, thus effecting a considerable saving.

A further economy would be a well on the veins flowing through the dormitory lot. Such a well would furnish all the water needed by the institution except for drinking purposes. At present all water is taken from the town mains at meter rates. A private supply would save annually a large percentage of the cost of installation.

#### THE FACULTY.

We have suffered some serious losses during the past two years, but in spite of that the faculty is still kept at a high point of efficiency. The principal, Doctor Klock, was called to the principalship of the Lowell Normal School during the past spring term, by the Massachusetts State Board of Education; but the trustees were able to retain his services at an increase of salary.

#### NEED OF MORE ROOM FOR MODEL SCHOOL.

The most serious present need of the school is more room for the model school, which, it will be understood, is the common schools of the village of Plymouth. In common with most other village schools, the attendance in Plymouth schools has largely increased within the past few years, so that we have three rooms crowded to twice their rated capacity, and one other filled to about its normal capacity. For several years past, the management has been obliged to improvise recitation rooms and to utilize corridors.

Obviously, this is bad both for the children themselves and for the normal students who are presumed to learn here what good schools are.

Believing that conditions had become such that the board

could no longer properly be responsible for the endurance of such untoward conditions, the following resolutions were presented to the school board of Plymouth in October.

*Resolved*, That the secretary be instructed to notify the school board of Plymouth, that on and after October 13, the trustees will be compelled by crowded conditions to conduct but one session per day for the four lower grades of the training school.

Accordingly, but one session per day has been maintained for the four lower grades, a part of the children attending in the forenoon and the remainder in the afternoon.

For five years past the town of Plymouth has been obtaining schooling for its children below high school grade at the cost of \$1,000 annually plus a per capita charge of \$1.35, the state owning the schoolhouse. If the normal school were elsewhere, the cost to the town for such schools as towns of the type of Plymouth usually maintain would fall between five and six thousand dollars beside the cost of school buildings. The contract between the town and the trustees is a lineal descendant of that entered into at the time the normal school was established.

During the past school year, the trustees proposed to the school district of Plymouth that it erect a school building sufficient in size for the common schools of the village of Plymouth, agreeing to remit the existing charge of \$1,000 for tuition in case the district should provide a satisfactory building to cost not less than \$25,000. The proposal was accepted by the district, a building committee appointed, and even plans obtained for the building, when a special meeting, called for the purpose, rescinded all previous action.

The trustees are thus left under obligation to school the common school children of Plymouth for at least another year, without a building adequate for their housing. Meantime the regular work of the normal school is, of course, greatly hampered.

## NEED OF MORE NORMAL SCHOOLS.

The applications for admission to the school are largely in excess of the accommodations. The accommodations at the dormitory are entirely insufficient, and the extent of the model and training schools is entirely inadequate for the training of more normal students than those now registered. In a word, the more students we enroll in addition to what we now have, the poorer must the training given be.

The trustees, therefore, voted at their October meeting, that the number of girls to be enrolled be limited to one hundred and fifty; that no further attempt be made to train students by practice-teaching, but rather that the training school be converted into a model school only, until such time as room sufficient for training shall be provided; that, upon provision of such room, the training school feature be resumed.

It was also voted at the same meeting, that it is the sense of this board that facilities for training teachers are urgently needed which will provide for the annual graduation of at least five times as many students as can be graduated at the present institution.

Your honorable body is also respectfully referred to the report of the Superintendent of Public Instruction upon the condition of the school, and to the reports of the treasurer and the principal, made a part of this report.

His Excellency CHARLES M. FLOYD,  
HENRY C. MORRISON,  
*ex officio.*

BENJAMIN F. DAME,  
JAMES H. FASSETT,  
GEORGE D. TOWNE,  
HENRY H. CLARK,  
CHARLES R. CORNING,

*Trustees New Hampshire State Normal School.*

## REPORTS OF THE TREASURER

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*To the Trustees of the New Hampshire State Normal School:*

GENTLEMEN,—I herewith submit my report as treasurer for the year ending August 31, 1907.

### RECEIPTS.

Cash in treasurer's hands, September 1, 1906,	\$2,912.31
“ of state treasurer,	31,250.00
“ “ J. E. Klock (Normal Hall account),	1,000.00
“ “ J. E. Klock, proceeds of boiler sale,	200.00
“ “ J. E. Klock, tuitions,	213.00
“ “ town of Holderness, tuitions,	34.00
“ “ U. S. Rapid Fire Gun Company, for engine returned,	400.00
“ “ Plymouth School District, on contract,	1,000.00
	<hr/>
	\$37,009.31

### DISBURSEMENTS.

Paid for salaries,	\$18,424.19
“ “ repairs and improvements,	10,688.62
“ “ books and supplies,	507.32
“ “ furnishings and apparatus,	397.99
“ “ lighting and water,	68.24
“ “ fuel,	466.47
“ “ insurance,	172.50
“ “ land purchase,	200.00
“ “ lectures,	150.00
“ “ advertising and printing,	71.00
“ “ miscellaneous expenses,	435.72
Cash in treasurer's hands,	5,427.26
	<hr/>
	\$37,009.31

Respectfully submitted,

GEORGE H. ADAMS,

*Treasurer.*

September 10, 1907.



I have this day examined the foregoing account and find the same correctly cast and properly vouched.

HENRY H. CLARK,  
*Auditor.*

*To the Trustees of the New Hampshire State Normal School:*

GENTLEMEN,—I herewith submit my report as treasurer for the year ending August 31, 1908.

RECEIPTS.

Cash in my hands September 1, 1907,	\$5,427.26
“ of state treasurer,	25,000.00
“ “ Plymouth School District for text-books and supplies for school year 1906-1907,	302.40
“ “ J. E. Klock, for coal at Normal Hall,	1,000.00
“ “ Plymouth School District, on contract,	500.00
	<hr/>
	\$32,229.66

DISBURSEMENTS.

Paid for salaries,	\$20,046.96
“ “ repairs and improvements,	1,410.22
“ “ books and supplies,	2,122.11
“ “ furnishings and apparatus,	617.71
“ “ water,	134.45
“ “ fuel,	3,374.80
“ “ insurance,	122.50
“ “ advertising and printing,	177.11
“ “ miscellaneous expenses,	921.76
Cash in treasurer's hands August 31, 1908,	3,302.04
	<hr/>
	\$32,229.66

Respectfully submitted,  
GEORGE H. ADAMS,  
*Treasurer.*

September 7, 1908.

I have this day examined the foregoing account and find the same correctly cast and properly vouched.

HENRY H. CLARK,  
*Auditor.*

## REPORT OF THE PRINCIPAL.

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*To the Trustees of the New Hampshire State Normal School:*

GENTLEMEN,—I respectfully submit my third biennial report as principal of the New Hampshire State Normal School.

Since my last report was made, a summer session has been instituted in the Normal School, thereby adding eight weeks more to the regular year's work. The necessity for this addition, which has been felt for several years, was recommended in my first report as one of the principal needs of the institution. Our financial condition, however, made it impossible to accomplish this result at an earlier date. Under the new plan, it was decided that a credit of one-half of a regular term be given for the work of the summer session. Hence it became necessary to organize a class for each half-term's work, as outlined in the catalogue. The studies of the first year, or the two regular terms only, will be offered during summer sessions. By thus doubling classes for each term's requirement, the same number of classes now necessary for the two years' course will ultimately be required for presenting one year's work during summer terms, thus making the expense per week for maintaining a summer session equal to the expense per week of any regular term. Though we have found it possible from our present appropriation to make a small annual saving, as shown by the report of the treasurer, a continuance of this state of affairs will be impossible if the summer work is maintained. In fact, it will require the strictest economy along all lines to continue the summer school out of our present appropriation. Owing to the fact that at the beginning session in 1907, only one class was organized, the extra cost up to the

present time has been very slight. However, an additional class will be organized each year until 1910, when the plan will be matured, and the maximum number of recitations will be provided.

#### ADVANTAGE OF SUMMER SESSIONS.

Through this plan, the Normal School plant will be used to the educational advantage of the state for twelve months of the year, instead of ten, as heretofore; thus affording to untrained teachers employed in the state during the school year, an opportunity for professional training, offered by the Normal School, during their usual summer vacation. With this object in view, a special course provided for experienced teachers may be completed during four summer terms, or even in less time, should the applicant choose to enroll in one or more of the regular terms. Students entering the general course, also, may reduce the time one year, by enrolling during summer terms. The summer session offering work which ultimately leads to graduation is now provided by many of the best professional schools in the country.

During the first summer, forty-two, and the following year, sixty-five, students were enrolled. This increase offers sufficient encouragement to warrant the continuance of the summer session as a permanent arrangement. It also gives promise that at the present rate, the summer work will become the most popular feature of the school. The division of time for the respective terms now offered by the Normal School is as follows:

Fall Term—September to January.

Spring Term—January to June.

Summer Term—July and August.

The school offers five courses of study—a General Course and a Kindergarten Course, each requiring two years; a

Graduate Course, a Special Course for experienced teachers, and a College Course for college graduates, each requiring one year for completion.

#### GENERAL COURSE AND KINDERGARTEN COURSE.

The General Course, which is designed primarily for those who wish to teach in the public schools below the high school grade, is open to graduates only of accredited high schools and academies, or applicants with equivalent education. Students, upon successfully completing this course, receive a diploma accompanied by a state certificate.

#### SPECIAL COURSE FOR EXPERIENCED TEACHERS.

A course of one year, comprising practice teaching, and studies chosen from the General Course, is offered to teachers of several years' successful experience. For admission to this course, high school graduation is not a requirement. At the completion of the course, a diploma is granted; this diploma, however, is not accompanied by a teacher's certificate.

#### GRADUATE COURSE.

The trustees, acting with the principal, may arrange, whenever it may seem desirable, a one-year graduate course of advanced professional study and practice-teaching, intended for graduates of this school, or of other normal schools of equal standing.

#### COLLEGE COURSE.

For admission, an A. B. degree, or its equivalent, is required, and for graduation from the course, one year's work in practice teaching and professional study must be completed. Students upon finishing this course are granted

a diploma accompanied by a high school teacher's certificate, issued by the state department of public instruction. With the required amount of successful experience, these certificates are accepted by the state superintendent for superintendencies in the supervisory districts of the state.

#### DEPARTMENTS.

In the Normal School proper, the work has been organized into departments, each under the supervision of a specialist. The policy of the school is not to duplicate work done by colleges or accredited high schools and academies of the state. Such work is duly credited students at the time of enrollment.

Thus far, the following departments have been organized:

(A) *Professional Work*: This department includes the work of psychology, pedagogy, school organization, and practice-teaching under supervision.

(B) *English Literature and History*: This department, which includes the history of education, aims to be professional, rather than academic.

(C) *English Composition*: Facility of expression, both oral and written, is the object of this work. The department is represented by the "Prospect," a self-supporting school paper, organized three years ago, edited and managed by the students, and composed of voluntary contributions from members of the classes in composition. The cover design and departmental cuts are the work of the art department. The steady improvement of this paper is typical of the development of the department of English composition.

(D) *Art*: Drawing, modeling and painting are included in this department, and correlated with the work of the entire school.



(E) *Music*: Special attention is given to work adapted to grades below the high school, including methods of teaching the subject, and choral practice.

(F) *Science*: In this department, classes are still organized in physics, chemistry, and biology for students who have failed to make preparation in these studies before entering the Normal School, although credits are accepted in these subjects from accredited high schools and academies. It is to be hoped that in the very near future all applicants for admission to the General Course will procure proper credentials in this work before entering the Normal School, so that all academic work may be discontinued and the attention of the department may be directed to professional study—the legitimate aim of the Normal School. When this is accomplished, the work of the department will be devoted to elementary science suited for grades below the high school, together with such professional training in high school subjects as occasion may demand. Gardening or elementary agriculture, also, should be considered the legitimate work of the department.

(G) *Manual Training*: A fully-equipped department of sloyd was added in 1904. Two years later, handwork was extended to include basketry and raffia. Owing to the overcrowded conditions in the building, the manual training has been continued in the basement where the rooms are poorly lighted, unsanitary, and in no way adapted to the needs of the department. This work of manual training should include household economics, and such handwork as may be introduced to the educational advantage of the lower grades; but this extension is impossible in our present quarters, and without incurring additional expense to maintain the department.

(H) *Physical Culture and Elocution*: This department which has been added recently has met with exceedingly satisfactory results. The aim of the work is not elocution-

ary effect, but rather a natural development of the speaking voice, secured by proper breathing and a correct use of the organs of speech. Indeed, too much emphasis cannot be placed upon the desirability of a pleasing, well-modulated voice for the teacher. Dramatic work, also, as a part of the regular program affords the student an opportunity of cultivating the poise and confidence necessary in teaching.

#### CORRELATION.

The work of the entire school is unified by correlating each department with all the others. By thus binding together different branches of knowledge in close interrelation, the essential purpose of education is emphasized.

#### THE LIBRARY.

More commodious accommodations are the most urgent need of the library. The dimensions of the present room are only twenty-five feet by thirty-five feet, a space too small to accommodate a hundred fifty students during the time when the library is being used for reference and study purposes. The shelf-room also has been outgrown. In addition to the four thousand volumes now in the library proper, about a thousand have to be stored outside. This surplus added to the yearly increase makes it desirable that the accommodations should be doubled. To facilitate the efficiency and convenience of this department of the school, a card catalogue should be installed, and some device planned for properly handling the periodicals. In order that valuable books and magazines may be preserved in a state of repair, there is urgent necessity for a considerable amount of careful rebinding. Regarding the departmental reference books, an annual increase is being made in every direction. If this percentage of accumulation con-

tinues, the Normal School will possess a library collection worthy of the institution.

#### GRADUATES.

Since 1900, three hundred eighty-five students have been graduated from this institution. Of this number, two hundred fifty are now teaching in New Hampshire and fifty-nine in other states. Prior to this time, six hundred fifty had been graduated, sixty-nine of whom are now teaching in the state, and eighty-four in other states. The present graduating class in all courses numbers eighty-seven. Although recent requirements make graduation from accredited high schools, or academies, a requisite for enrollment into the General Course, the rapid increase of students has made it necessary for the board to limit the number of students enrolled to one hundred fifty. Even with this restriction, the number graduating each year make it possible to offer in the future no more than observational work in the training department.

#### GOVERNMENT.

The discipline of the school is maintained by a system of self-government modeled after that of the state with its various departments. A governor and the other state officers are regularly nominated and elected. From time to time, with the approval of the faculty, bills are passed by the legislature and the senate regulating the affairs of the student body; and offenders against the established laws are arrested, tried by a student court, and duly punished. This system of government has developed into a dignified, self-reliant organization, far superior in its ethical effect to any form of faculty control. Since it is true that no one can govern others who cannot first govern himself, such discipline for the young teacher is invaluable.

## MODEL SCHOOL.

Up to 1903, the Normal School worked under a contract with the town of Plymouth, by which all the children of the village, including those in both high school and grades, were placed under the supervision of the Normal School, the state receiving from the town of Plymouth \$3,200 for this instruction. However, it soon became apparent that the facilities of the Normal School were inadequate to its needs. The town of Plymouth, realizing that the accommodations were not sufficient to house all the pupils, erected a high school building at a cost of \$40,000, thus relieving the Normal School of the burden of maintaining a high school; and at the same time making it possible to offer to the model school better equipment and service. Hence, in 1903, a new contract was made and ratified. By this agreement, the exceedingly low tuition required of the town of Plymouth was understood between the trustees and the committee to be a minimum charge, so determined to enable the town to afford a suitable structure to house its high school pupils. The principal terms of this contract are as follows:

In consideration of \$1,000 to be paid annually to the trustees of the New Hampshire State Normal School, they will support and maintain a model school of eight grades in Plymouth, and for \$1.35 paid for each resident pupil, all books and supplies also will be furnished free. The permanent joint school board shall consist of the trustees of the New Hampshire State Normal School, and the members of the school board of the school district of Plymouth. It is further agreed that this contract, which shall go into effect and become operative August 11, 1903, may be modified by either party after five years from date upon giving the other party one year's notice. This is the plan under which we are now working. The five-year agreement having expired this year, notice was duly given by the trustees that a change in the present contract must be made.

As a matter of fact, all the room of the normal building is required for the use of the Normal School, in order that the much-needed extension of library, manual training department, etc., may be possible. Therefore, steps should be taken at once to secure a building for the model school. The present expense to the state for maintaining this training department is practically one third of the entire appropriation. Although a model school is as necessary to a successfully conducted normal school as a laboratory is essential to a department of science, the present arrangement is fraught with greater expense than seems necessary.

Owing to the overcrowded condition of the model schools, the board of trustees of the State Normal School submitted to the town of Plymouth a proposition by which free tuition was to be furnished for children of the model school, provided the town would construct a suitable building for the training department. In June of the present year, the proposition was accepted by the town of Plymouth; and \$30,000 appropriated for a building for the model school; but owing to a difficulty regarding the securing of a site, at a special meeting called for the purpose, the former action of the town was reconsidered, leaving no provision for a building. At the beginning of the fall term of the present year, the first four grades were put upon half-day sessions. In spite of this necessary change, the large number of normal students who are obliged to observe in this department crowd the rooms to overflowing. If, however, the state laws could be so amended as to enable us to make contracts with systems in other cities, to which Normal students might be sent for training purposes, the expense of such work might be greatly reduced. Inasmuch as the number of children in Plymouth is insufficient to furnish practice-teaching to seventy-five or eighty students at the same time, a larger training school is a necessity. Therefore, the ideal plan is to separate the training department



from the model school, and retain for observational work the eight grades of Plymouth, housed in proper buildings constructed for the purpose. By means of such an arrangement, the town furnishing pupils for the observational department should be able to afford to defray a larger proportion of the expense than that required of the towns furnishing the training departments.

According to the present method, practice work is conducted during the last eighteen weeks of the course; but with the change suggested, it would be possible for students to complete all the professional training and observational work during the first three terms; spending the last term in practice-teaching in some system of schools where proper supervision could be exercised over this branch of the work.

#### NORMAL HALL.

This structure is so much too small, that over fifty students were refused admission last fall and as many as seventy-five will be turned away this spring. Although the entering class will be limited to one hundred fifty, from fifty to seventy will lack proper accommodations. From this state of affairs, it is evident that some provision for relieving this overcrowded condition must be made either here or elsewhere.

Although the price of living has advanced considerably during the past two years, the fee of \$75 per term, or \$150 per year, has been continued. By practicing the strictest economy, the dormitory has given satisfactory accommodations, and has made a profit of about \$1 per month for each student enrolled. At this rate, the Hall will, in the future, become self-supporting, and, beginning with the coming year, no appropriation will be required for furnishings.



## BUILDINGS, ADDITIONS AND REPAIRS.

In 1905 the legislature made a special appropriation of \$12,000 for an addition to the old dormitory. The building as constructed is 84 x 38 feet, and three stories high above the basement. This new structure contains a basement-kitchen, 27 x 36 feet; a pastry-room, 13 x 21 feet; a serving-room, 21 x 23 feet; dining-room, 36 x 62 feet; four bath rooms, each 7 x 7 feet; two lavatories, 7 x 15 feet; twenty single rooms, 9 x 15 feet; and two double rooms, 11 x 15 feet.

By the provisions of the bill, which made the appropriation for this addition, both the adoption of the plans and the construction of the building were left to the discretion of the governor and council. True to the prediction of the friends of the bill, the amount of the appropriation proved inadequate to erect a substantial structure of the required dimensions.

Since the erection of the new building, the general repairs and additions to the same have been as follows:

Grading grounds,	\$113.95
Jacking up building, .	219.07
Furniture, original fittings.	1,412.98
Floors and partitions,	579.95
Wiring,	150.00
<hr/>	
Total,	\$2,475.95

The general repairs and additions to the dormitory (old part included) have been as follows:

Piano,	\$500.00
Steel beds and mattresses,	1,304.50
Painting old building and cottage,	1,229.34
Reshingling old building.	260.00
Incidental repairs,	148.90

Heating plant for cottage,	\$245.36
Ice-house,	320.00
Land (between street and building),	200.00
	<hr/>
Total,	\$4,208.10

The additions to the Normal School building have been as follows:

Manual training, installing,	\$580.57
Manual training, ceiling and repairs on room,	66.01
Clocks in program system,	280.50
Pianos,	610.00
Coal pocket,	148.20
	<hr/>
Total,	\$1,685.28

#### HEATING AND LIGHTING.

In order to meet the expense of the necessary improvements, it became necessary to practice the closest economy in administering the finances of the school and the dormitory. As heretofore stated, a small annual saving was made for several years. At the time of installing the new plant, the balance in the general fund was \$9,162.31. The saving from the dormitory during the same time was \$3,460.65. From these two sources alone, the expense for these improvements was fully met. Through thus modernizing and enlarging our heating-plant, with the addition of the lighting plant, the service has been improved and a substantial saving has been made in the annual cost of heating and lighting the buildings.

During the fall of 1907 a central heating and lighting plant, together with a steam laundry, for the dormitory, were installed at a total expense of \$11,417.85; \$7,957.20 was paid from the general fund, and \$3,460.65 from the profits of the dormitory. These amounts were divided as follows:

## HEATING AND LIGHTING PLANT.

Boilers,	\$1,067.50	
Engine,	469.00	
Generators,	291.40	
Steam-fitting and wiring.	5,143.73	
Radiators,	68.83	
Lights,	40.92	
Foundations and boiler plastering.	63.50	
Freight,	110.03	
Conduit,	1,395.26	
Incidentals,	175.36	
Coal pocket,	148.20	
	—————	\$8,973.73

## LAUNDRY.

Machinery,	\$898.75	
Floor,	454.95	
Partitions,	125.00	
Piping,	47.92	
Incidentals,	160.10	
	—————	\$1,686.72
Architects' commissions.		757.40
		—————
Total,		\$11,417.85

The principal items of expense for the heating and lighting plant are as follows:

*Engine:* Shepherd High Speed engine, running at 350 revolutions per minute, furnishing 25 horse-power at 100 pounds of steam, equipped with automatic governor.

*Boilers:* Two Harrison Safety boilers, capacity 80 horse-power each, regulated at a working pressure of 110 pounds.

*Pump:* One Warren Steam pump, No. 5232, having a 5¼-inch steam cylinder, and 5-inch water cylinder, capable of delivering 72 gallons per minute.

*Generators:* Two Crocker-Wheeler generators, size 7.51, type CCO, each furnishing 125 volts at 66 amperes, normal output of 9.25 kilowatts at 1425 revolutions per minute.

*Switchboard:* Slate switchboard, equipped with two Weston ampere meters and one Weston volt meter, two rheostats and four switches.

#### DISTRIBUTION OF FUNDS FOR 1908 AND 1909.

During the present year the board made the following distribution of the annual appropriation for maintenance:

Text-books and supplies,	\$750.00
Incidentals,	600.00
Buildings and repairs,	700.00
Furnishings in Normal Hall.	300.00
Library and lecture fund.	500.00
Water,	200.00
Heating and lighting.	1,700.00
Furnishings in school.	200.00
Entertainment fund,	150.00
Janitor service,	1,700.00
Clerk,	800.00
Teachers,	17,200.00
Printing,	200.00
	<hr/>
Total,	\$25,000.00

After defraying the necessary expense of repairs which are now being made, \$4,000 will be left in the hands of the treasurer. This amount, however, will be needed for the construction of boiler rooms and a coal pocket.

#### PRESENT NEEDS.

The greatest present need of the Normal School is more room. The model school should be removed at once, leaving the entire building free for the proper expansion of

the Normal School, including library, manual training, kindergarten training, and other necessary departments. Another pressing need is additional room at the dormitory.

For reducing the present excessive cost of the water supply, a well and a pump should be installed for all but drinking purposes.

To protect the coal supply from the waste incident upon its exposure to the elements, a coal pocket sufficiently large to house the boilers and engines, also, is desirable and necessary.

The most vitally important recommendation suggested in the foregoing report concerns the enlargement of the training department.

Respectfully submitted,

J. E. KLOCK.

*Principal.*

STATE OF NEW HAMPSHIRE

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THIRTY-THIRD ANNUAL REPORT

OF THE

Commissioners *of* Pharmacy

FOR THE YEAR 1908.





## Commission of Pharmacy

*President*, EDWARD H. CURRIER, Manchester.

*Secretary*, FRANK H. WINGATE, Nashua.

*Auditor*, BEN O. ALDRICH, Keene.

December 1, 1908.

*To His Excellency, Charles M. Floyd Governor of New Hampshire, and Honorable Council.*

GENTLEMEN: In compliance with Chapter 135, General Statutes, relating to Pharmacy and the sales of drugs and medicines, I have the honor to transmit herewith the report of the Board of Pharmacy for the year 1908.

FRANK H. WINGATE,  
*Secretary.*

## Report of Commission of Pharmacy

*To the Governor and Honorable Council:*

We herewith submit to you the thirty-third annual report of the Commission of Pharmacy and Practical Chemistry for the State of New Hampshire, for the year ending October the first, A. D. 1908.

Quarterly meetings of the Board have been held as heretofore in the State House at Concord, on the fourth Wednesday of October, January, April and July.

The first quarterly meeting of the Board for the ensuing year was held in Concord, Wednesday, October the twenty-third, 1907.

Messrs. Currier, Aldrich and Wingate present. The Board organized as follows:

*President*, Edward H. Currier, Manchester.

*Secretary*, Frank H. Wingate, Nashua.

*Auditor*, Ben O. Aldrich, Keene.

The meeting opened at nine o'clock. The whole number of candidates for the senior class was ten: Of this number, the following were successful and received certificates as registered Pharmacists:

H. L. Simpson, Colebrook, N. H.

Leon H. Wheeler, Warner, N. H.

R. J. Putnam, Hanover, N. H.

Harry M. Porter, Ashland, N. H.

Frank C. Hopkins, Keene, N. H.

Charles H. Smith, Bennington, Vt.

For the junior class only two candidates appeared, neither of whom was successful.

CONCORD, N. H., January 1908.

The second quarterly meeting of the Board of Pharmacy was held this day in Representative Hall. Messrs. Currier, Aldrich and Wingate present. The number of candidates present for the senior examination was sixteen. Of this number the following were successful and received certificates as registered Pharmacists:

Hugh F. McDonough, Manchester, N. H.

Wesley O. Emerson, Groveton, N. H.

Charles F. Abbott, Hanover, N. H.

For the junior class, four candidates appeared, none of whom was successful.

It was voted by the Board of Pharmacy, that after this date the percentage required of candidates by the New Hampshire Board of Pharmacy shall be seventy-five (75) per cent to conform to the requirements of the Boards of Pharmacy of other states.

NASHUA, N. H., February, 25, 1908.

A special meeting of the New Hampshire Board of Pharmacy was held in this city, on above date, for a special examination. Only one candidate presented himself and he was unsuccessful.

CONCORD, N. H., April 22, 1908.

The third quarterly meeting of the New Hampshire Board of Pharmacy was held in this city on the above date. Messrs. Currier, Aldrich and Wingate present. Seventeen candidates presented themselves for the examination. The following were successful and received certificates of registration:

Joseph H. Low, Derry, N. H.

William C. Labombarde, Nashua, N. H.

Frederick A. Brandes, Webster, Mass.

For the junior class, six candidates appeared. The following three were successful and received junior certificates:

Edgar Colby Knowlton, Manchester, N.H.

Lyle N. Newton, Manchester, N. H.

J. G. Emanuel Gregoire, Manchester, N.H.

At his request, and by vote of the commissioners, a duplicate certificate was sent to Mr. E. L. Putnam of North Woodstock, whose certificate was destroyed by fire, February 22.

CONCORD, N. H., July 22, 1908.

The fourth quarterly meeting of the Board of Pharmacy was held in this city on the above date. Messrs. Currier, Aldrich and Wingate present. Nine senior candidates presented themselves for the examination. The following were successful:

J. Stanley Galligher, Lynn, Mass.

Payton T. Young, Manchester, N. H.

The junior class consisted of three candidates, two of whom were successful:

Harry G. Webb, Epping, N. H.

Lucien J. Martin, Manchester, N. H.

## EXAMINATIONS.

Examinations of applicants for registration in Pharmacy are held quarterly in the months of January, April, July and October and are held in the State House at Concord.

The subjects included in the examination are Chemistry, theoretical and practical, Pharmacy, Botany, Materia Medica and Therapeutics, Toxicology and Examination and Identification of Drugs and Medicines.

Whole number of Pharmacists registered in New Hampshire is 814; whole number registered during the year, 15; average percentage of successful candidates, 28; whole number of applicants, 53.



## CONDITION OF PHARMACY

Your commissioners represent that legitimate pharmacy within our borders is in a healthy condition.

It is the practice of your commissioners, in cases where violations of the statutes relating to Pharmacy are suspected, to investigate and explain the provisions of the law; if advice is heeded well and good; persistent wrong doing is corrected by legal measures. Drug stores in the following places have been visited;

Woodsville.  
Pike.  
Warren.  
Plymouth,  
Merideth.  
Center Harbor.  
Wolfborough.  
Concord.  
Nashua.  
Manchester.

It was found necessary to institute proceedings against two clerks employed in the store of the Pike Manufacturing Co., at Pike Station, in the town of Haverhill; also against the proprietor of the drug store at Warren, all in Grafton county.

John Udall, manager, and Svend Lange, clerk for the Pike Station Store Co., and Dr. Francis L. Gerald of Warren, were each arraigned before the Superior Court for Grafton county at Woodsville. All pleaded "Nolo" and a fine of one hundred and fifty dollars and costs was imposed upon each.

We desire to call attention of members of our profession to the change in the percentage required of candidates for registration. The requisite percentage prior to

1908 was 67 per cent. The commissioners voted in January to raise the required percentage to 75 per cent. This is right in line with the requirements of other Boards of Pharmacy, and in harmony with the recommendations passed by associations all over the country.

We take this stand on the question: If ever our State Pharmacy Laws are so amended as to give its commissioners the power to reciprocate with other states in the exchange of certificates, the percentage now required by the New Hampshire Board will be required by other State Boards with which the exchange is made.

We again recommend that limitations of certificates and renewal, annually or biannually, without examination, for a nominal fee, be embodied in our Pharmacy Law. That power be given the commissioners to revoke certificates of registration for just and proper cause, all subject to the law of appeal, and re-registration granted whenever right and proper conditions prevail.

This will be a necessary and preparatory step toward placing New Hampshire in a position to consider interstate reciprocity with certificates of registration.

EDWARD H. CURRIER

FRANK H. WINGATE

BEN O. ALDRICH

*Commissioners of Pharmacy.*

The total average percentage to obtain registration is seventy-five per cent.

Graduates of Schools of Pharmacy will not be registered without examination.

Graduates of Schools of Medicine will not be registered without examination.

The Commissioners have officially sanctioned the sale of the following articles by unregistered persons, believing they are not included in the terms "drugs and medicines;" Alum, amonia, baking powder, benzine, borax, brimstone, blue vitrol, camphor, copperas, cream tartar, chloride of lime, flavoring extracts, glycerine, hellebore, insect powder, Iceland moss, Irish moss, indigo; oils-sweet, olive, machine, sperm, lineseed petroleum; potash, resin, saleratus, sal soda; seeds-flax, canary, anise, hemp, millet, coriander; spirits of turpentine, washing compounds.

## RULINGS OF COMMISSION.

Apothecaries, druggists and all persons engaged in the manufacture, compounding or selling of drugs, poisons or medicines, are required to be extraordinarily skillful, and to use the highest degree of care known to practical men, to prevent injury from the use of such articles and compounds.

The Pharmacy law requires that every drug store in New Hampshire must be under the direct charge of a registered pharmacist of this state, and also requires that every person who sells drugs and medicines, or compounds or dispenses medicines shall be registered.

A registered assistant may sell drugs and medicines at any time under the direct supervision of a registered pharmacist, and he is the only person so privileged. A registered assistant has no right or authority to manage or conduct a pharmacy, either on his own account or for another. He may, however, act as clerk or salesman in a drug store or pharmacy, during the temporary absence of the owner or manager.

The Commission of Pharmacy construes the words "temporary absence" to mean while the registered pharmacist is gone to his meals or any like necessary duty, requiring no more time than is generally so consumed. Prolonged or unnecessary absence is not to be considered.

The registered assistant cannot take charge of a store for weeks at a time. It is the evident intention of the Pharmacy law to keep every drug store or pharmacy under the immediate charge or supervision of a registered pharmacist during all times the drug store or pharmacy is open for business.

Any place where drugs and medicines are sold is a drug store within the law.

A practicing physician unregistered can not keep a drug store or sell medicines which he has not prescribed.

# PHARMACY LAW

of the

## STATE OF NEW HAMPSHIRE

### CHAPTER 135

#### SALES OF DRUGS AND MEDICINE

SECTION 1. No person shall conduct or keep a shop of any kind in this state for the purpose of retailing drugs, medicines, or such chemicals as are used in compounding medicines, or engage in the business of compounding and putting up prescriptions of physicians and selling medicines, either as proprietor, agent, or assistant, without having first obtained a certificate from the commissioners appointed under the provisions of this chapter; but it shall be lawful for any person to sell proprietary medicines or to be an owner in the stock in trade in any druggists or apothecary's shop, if he takes no part in conducting or keeping the shop.

SECT. 2. There shall be a commission styled the commission of pharmacy and practical chemistry, which shall be composed of three commissioners, appointed by the governor with the advice of the council, each of whom shall hold his office for three years, and untill his successor is appointed and qualified. In case a vacancy shall occur at any time from any cause, the governor, with advice of the council, shall fill the vacancy for the unexpired part of of the term. The commission as now constituted is continued, subject to the provisions of this chapter.

SECT. 3. The commission shall hold meetings for the examination of applicants for registration, granting of certificates, and the transaction of other necessary business, at least quarterly and at such time and place as they see fit.

SECT. 4. They shall examine any person desiring to engage in the business of apothecary and druggists, and, if found skilled and learned in pharmacy, shall give to him a certificate, stating that he is a skilled pharmacist and authorized to engage in the business of apothecary and druggist.

SECT. 5. They shall examine all applicants over eighteen years of age who have served two years under a registered pharmacist, and grant to such as pass satisfactory minor examinations, a certificate as "registered assistant." Such certificate shall not entitle the holder to act as manager of a drug store or pharmacy.

SECT. 6. The commissions shall procure and keep a suitable book at the office of the secretary of state, wherein they shall register the names and places of residence of all persons to whom they shall issue certificates, and the dates thereof, which shall be open to the examination of all persons at reasonable times.

SECT. 7. The commission shall file with the secretary of state on or before the first day of December in each year, a report to the governor and council upon the condition of pharmacy in the state, and containing a record of their acts and proceedings.

SECT. 8. Each applicant for a pharmacist's certificate shall pay to the commission a fee of five dollars, and each applicant for a registered assistant's certificate a fee of two dollars, for the use of the board. Each commissioner shall also receive five dollars per day for actual service for not exceeding (twenty-five)† days annually, and all necessary expenses incurred in the discharge of his duty, to be paid from the state treasury.

SECT. 9. All pharmacists lawfully registered are authorized to keep spirituous liquors for compounding their medicines.



SECT. 10. If any person shall engage in the business of retailing and vending, directly or indirectly, drugs, medicines and chemicals, and in dispensing medicine and compounding physician's prescriptions, without being registered as provided by this chapter or the law heretofore in force, he shall be punished by a fine not exceeding fifty dollars for each week he shall continue the business without being so registered.

SECT. 11. The provisions of this chapter shall not be so construed as to apply to physicians compounding and putting up their own prescriptions.

SECT. 12. It shall be the duty of the commissioners to enforce the provisions of this chapter. For actual services and necessary expenses in the performance of this duty, they shall be paid from the state treasury such sums as the governor and council may determine and approve.

(Approved March 7, 1901.)

†Substituted for "fifteen" 1899, 68:1.





Report of State Agent  
FOR  
Suppressing the Gypsy and  
Brown-Tail Moths.



REPORT OF STATE AGENT  
FOR  
Suppressing the Gypsy and  
Brown-Tail Moths.

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*To His Excellency the Governor and the Honorable Council:*

Agreeably to an act to provide for the suppression of the gypsy and brown-tail moths enacted at the last session of the legislature, I was on the 4th of December, 1907, appointed agent to carry on the work. Previous to my appointment the governor and council had assumed direct charge and had done the summer's burlapping by contract with Massachusetts parties. Trees were burlapped for the destruction of the gypsy moth caterpillar principally in the coast towns and along the Massachusetts state line in Rockingham and Hillsborough counties. The cost of this contract work amounted to about \$7,500.

THE GYPSY MOTH.

Upon assuming charge I found that the state was infested with the gypsy moth to a much larger extent than had been heretofore realized. The fall scouting had demonstrated that fact, and while Rockingham county showed a most serious condition of affairs, Hillsborough county south of Manchester was also badly infested; they had also been found as far north as Concord and as far west as Brookline.

Confronted by this serious condition of affairs and with



an appropriation wholly inadequate to combat the same, I deemed it most important that we make our condition known to the national government asking from them additional financial aid.

At that time a bill was pending before congress carrying an appropriation of \$150,000 for the New England states for the suppression of the gypsy and brown-tail moths. Whereupon I appeared before the house Committee on Agriculture at Washington and set forth the serious condition of affairs in our state asking that the appropriation be increased to \$250,000. As the department had only asked for \$150,000 it was an unusual procedure ; however, our delegation interceded and the increase was granted and the bill carrying an appropriation of \$250,000 passed the house and senate.

The work has since been carried on by co-operation with Mr. Dexter M. Rogers, special field agent for the national government, the government carrying the major part of the pay-roll, while the state has bought the material for, and paid the expenses incidental to the execution of the work.

During the winter of 1907-1908, crews of men were kept at work scouting and throughout the worst infested districts in cutting, pruning, tin-patching and improving the general conditions. Upon the arrival of the caterpillar season in the summer of 1908, burlap was placed upon one hundred and twenty-five thousand trees ; this burlap was tended throughout the season and the caterpillars destroyed, which work gave daily employment to over one hundred men. At the earliest possible moment in the fall trained men were set to work scouting for and destroying nests, which work is being carried on at the present time, giving daily employment to one hundred and fifty men.

## THE BROWN-TAIL MOTH.

The policy of the work pursued against the brown-tail moth has been of an entirely different nature. Actual antispreading work can be done to advantage against the gypsy moth, since the female of this insect does not fly, and the species is spread only in the larval or caterpillar stage, when it spins down from roadside trees and alighting upon some vehicle or person is thus carried for long distances. With the brown-tail moth, however, the case is entirely different. The female flies readily and is carried during its period of flight by the prevalent winds for very long distances. It is therefore much more difficult to prevent the spread of this insect than of the other. To attempt such work as a government or state measure and with the funds appropriated would be futile. It is safe to say that to effectively check the brown-tail moth would require its complete extermination; and to bring this about millions of dollars would have to be spent. Plainly the thing to do, therefore, with regard to the brown-tail moth, is to secure the active and intelligent co-operation of all property-holders throughout the infested district. I am glad to note that in the worst infested districts a fungous disease broke out last summer destroying thousands of caterpillars. The best authorities say that undoubtedly this disease will spread among them and will ultimately result in their destruction. While they have increased in numbers the infested district of our state has not materially increased in area in the last two years.

Upon assuming charge of the office I at once opened correspondence with the mayors of cities and selectmen of towns throughout the infested districts calling their attention to the law and its requirements, asking for the enforcement of the same so far as the clearing of the

brown-tail moth nests on orchards, trees on cultivated land and shade trees.

These demands were generally respected and the work during the winter months was carried out along these lines. I am pursuing the same policy at the present time.

#### THE SPECIES CONTRASTED.

The gypsy moth and brown-tail moth are constantly confused in the minds of people. While the caterpillar of the brown-tail moth is destructive, injury to woodlands and forests is not as severe as that accomplished by the gypsy moth, as coniferous trees are not attacked by them and the most that can be done is to compel land owners to clear their orchards and trees on cultivated land for their own protection, and to compel cities and towns to clear the trees along the highway.

The caterpillar of the gypsy moth feeds upon the foliage of practically all orchard trees, all shade and ornamental trees, all out-of-door shrubs, and all forest trees. Not only are the deciduous forest trees stripped, but the coniferous trees as well. In June and July patches of forests in the infested territory are stripped of every green leaf and the trees appear as bare as in winter. After several such consecutive strippings, deciduous forest and shade trees are killed, but with a coniferous tree, such as a pine, hemlock or spruce, one complete stripping will cause death. It is this fact which makes the gypsy moth so much more serious a pest than the brown-tail moth, and the loss which will result from its spread will be very great, owing to the coniferous forest interests.

In cities and towns the insect does damage not only by destroying all vegetation, but by swarming in numbers upon and about houses, frequently entering them. It has been the experience in eastern Massachusetts that where

a locality becomes thoroughly infested the value of real estate rapidly depreciates, and it becomes a matter of difficulty to rent or sell property.

#### THE HISTORY OF THE SPREAD OF THIS PEST IN MASSACHUSETTS.

This shows conclusively the necessity of vigilance on the part of New Hampshire in carrying on this work. In 1890 the gypsy moth became so serious a pest that the commonwealth began exterminative work against it. This was continued for ten years. By 1900 the state work had so reduced the moth that it was doing little or no serious damage, and had, indeed, ceased to be generally noticed, having been exterminated in many places. The commonwealth then abandoned its operations against the insect; whereupon it rapidly gained headway, and soon became again a formidable menace. Had a small annual appropriation been made and continued at that time, the future spread would undoubtedly have been prevented and the control of the insect become more effectual. In 1904 the moth had increased so enormously that it became evident that state aid was again necessary for its control, and the Massachusetts legislature of 1905 made an appropriation of \$150,000 per annum to carry on the work.

Since then the appropriation has been increased yearly and last year there was expended in Massachusetts, directly and indirectly over \$1,000,000 for the suppression of the gypsy moth.

It is apparent that our state is called upon to make a most vigorous fight against this common enemy. We cannot expect to receive financial aid from the national government unless the state makes liberal appropriation to assist in the work.

This winter's scouting has demonstrated that we have

the gypsy moth in sixty-three towns, the farthest point north being Ossipee.

In conducting this department thus far I have pursued those lines and adopted certain policies found to be most desirable and effective in other states where the work has been in progress for a longer period. With the developments of the last year and the experience which I have gained I trust that I shall be able to cope with the existing conditions.

I wish to acknowledge my appreciation for the sound advice and many favors received from Dr. L. O. Howard, chief of the Bureau of Entomology at Washington, Mr. Dexter M. Rogers, special field agent of the national government, Prof. A. F. Kirkland of Boston, and other gentlemen in the moth departments of Maine and Massachusetts.

Respectfully submitted,

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